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Prorating in Newsprint at Turning Point

Constructive Action Needed In Opinion of W. A. Higgins To Prevent Break Down of Present Prorating Plan In Newsprint Industry — Lack of Full Cooperation of All Mills Held Decisive Factor.

[FROM OUR REGULAR CORRESPONDENT]

MONTREAL, Que., September 23, 1940—That prorating in the newsprint industry in Canada has reached a turning point and may break down altogether unless constructive action is taken is suggested in an article by W. A. Higgins, B.Sc.F., in the Financial Times of Montreal. Prorating is the distribution of tonnage orders among Ontario and Quebec newsprint mills in proportion to the effective capacity ratings of those mills to which the policy applies.

Prorating to Achieve Stability

The purpose of prorating when it was undertaken as a joint policy of the governments of the two provinces were, and still remain, threefold:

1. To assure each province of its fair proportion of tonnage, employment and revenues.
2. To spread employment more evenly among mill towns;
3. To promote recovery and stability by which working conditions, Crown revenues and public income might be expected to improve.

These purposes have been largely achieved, with some notable exceptions due to certain companies having been exempted, following failure to provide joint enforcement of the policy. Says Mr. Higgins:

"Effects of failure to comply with prorating policy have been aggravated by the exemption from prorating extended to certain companies, including Ontario Paper Co., early in 1938. Also exempted were the Spruce Falls mill in Ontario and the Donohue and Anglo-Canadian mills in Quebec, all owned by or under contract to publishers in the United States and England. These exemptions now amount to 400,000 tons annually and in 1939 accounted for one-sixth of the total newsprint business of the two provinces. In Ontario exempted tonnage was 28 per cent of provincial shipments in 1939 while Quebec's exempted tonnage was 10 per cent. This accounts for Ontario's 67.7 per cent operating ratio in 1939 in comparison with that of 60.1 per cent for Quebec. Exempted mills run at or near to 100 per cent of effective capacity while prorated mills may be running at under 50 per cent with consequent unemployment of labor in many mill towns.

"Deterioration in prorating policy over the past year and increasing lack of compliance by some producers have been attributed largely to the exemption of certain mills. Nine newsprint manufacturers in Quebec have petitioned the provincial government to reconsider the matter of tonnage exemptions and to terminate all existing exemptions from the government's prorating policy after a reasonable notice to the mills concerned. Before exemptions can be removed in one province joint action of the two provinces is required on the situation to place all newsprint producers in the two provinces upon the same basis. At present prorated companies account for 3,527,700 tons of newsprint capacity while exempted companies have a capacity of 408,000 tons annually."

Defect of the System

Mr. Higgins points out that the defect of the system is that it is a negative rather than a positive policy since it apportions only business already secured, makes no provision for gaining additional business against the competition of other countries and tends to reduce aggressive sales effort by the individual company.

Success Dependent Upon Several Factors

He urges changes in the prorating policy—the adoption of unified sales action by the newsprint companies; a uniform administration backed by definite penalties applied impartially and automatically for definite infractions; and the settlement of the question of exempted mills. In this connection he refers to the disruption which may follow when the war is over unless constructive action is taken at this turning point when signs of the breakdown of prorating are appearing.

May Reorganize Lake Sulphite

[FROM OUR REGULAR CORRESPONDENT]

TORONTO, September 23, 1940—An early end to the receivership of Lake Sulphite Pulp Company, Ltd., is in prospect, as a result of discussions now under way, according to the Financial News Bureau, which says: "Considerable progress has been made in the latest negotiations and, if final differences can be reconciled, an announcement of reorganization can be looked for in another week or ten days."

More Power to Be Added in Fox River Area

Public Service Corp. To Double Generating Capacity of Steam Plant Serving Paper Mill Area In Fox River Valley—Work Starts On New Badger Paper Mills Building — Other Industrial News.

[FROM OUR REGULAR CORRESPONDENT]

APPLETON, Wis., September 23, 1940—Approval has been given the Wisconsin Public Service Corporation to double the generating capacity of its Bayside steam plant at Green Bay, Wis. The company serves a portion of the Fox River Valley Paper mill area.

The application was made to the Wisconsin Public Service Commission to spend approximately $2,650,000 for buildings, boiler installations and generators. The commission found that it would be impossible for the corporation to purchase power from other sources to meet its growing demands, therefore authorized the company to proceed.

About 30,000 kilowatts will be added to the plant's generating capacity, and total annual fixed expenses after the plant is built will be about $680,642. When the expansion is completed, the company's total investment in the Bayside property will be $5,395,761.

Northwest Chemists Meet

Monthly meetings of the Northwestern Wisconsin section of the American Chemical Society were resumed with a session September 18 at Science hall of Lawrence College, Appleton, Wis. The speaker was Prof. W. H. Peterson of the University of Wisconsin, whose subject was "Vitamins and Micro-Organisms."

Thilmany Slogan Contest Ends

A contest for safety slogans has been completed by the Thilmany Pulp and Paper Company, Kaukauna, with 49 employees submitting 115 slogans. The winner of first prize of $3 was Warren Brenzel, whose slogan was "Practice, Preach, Promote Safety for Everyone." Second prize of $2 was won by Sylvester Van Gompel, whose slogan was "Stay Safely Alert. Don't Get Hurt."

Work Starts on New Badger Building

Excavation has been completed for the new building under construction at the Badger Paper Mills, Inc., Peshtigo, Wis. Actual construction will get under way at once. The building will house expanded finishing rooms, where 180 persons will be employed.

Marathon Wins at Soft Ball

The Marathon Paper Mills Company team of the Menasha Products division at Menasha, Wis., emerged as the champion of the Menasha Industrial Softball League for the 1940 season. During the season the team ran up 21 victories and had only two defeats. A plaque is to be awarded the team, and each member will receive a gold softball. The squad was managed by Tony Buzanowski.

F. J. Sensenbrenner Named Director

F. J. Sensenbrenner, president of Kimberly-Clark Corporation, Neenah, Wis., has been named to the board of directors of a new organization known as the Wisconsin Citizens' Public Expenditure Survey. George P. Nevitt of Oshkosh, Wis., is the president.

Britain Further Controls Paper

Further indication of economies in effect in the paper trade in Great Britain is revealed in the issuance of a new order (No. 20) controlling the use of paper. It replaces the Control of Paper (No. 16) Order, the provisions of which are continued with certain modifications and extensions. Among its provisions are the following:—

Posters relating to the sale of goods may be exhibited inside a shop.

The restrictions on advertising circulars are increased, the weight that may be distributed being reduced to one-fifth of what was distributed in the corresponding three months of last year, but this weight may be made up to 56 lb. over the months November, December, 1940, and January, 1941, to enable small traders to distribute advertising calendars, diaries, etc., which have for the most part already been made.

Wrapping and packing of articles is limited to the extent required for the protection of the article, and the inclusion of advertising matter is prohibited.

A statement by the Minister of Supply says that while supplies of home produced paper-making materials are being developed to the fullest possible extent, they cannot be sufficient to replace the supplies formerly obtained from overseas. The Minister of Supply has no hesitation in calling upon the public to sacrifice some of the lavish uses to which paper has been put in the past, though he regrets that these economies must affect adversely employers and employed in the businesses which have produced the articles to which the restrictions apply.

Container Co.'s Assessment Is Cut

[FROM OUR REGULAR CORRESPONDENT]

WATERBURY, Conn., September 23, 1940—Superior Court Judge Alfred C. Baldwin has rendered a judgment reducing the assessed value of the Waterbury Corrugated Container Company by $60,000. The city assessment on the 1939 list will be at the rate of $149,350 instead of the $209,350 originally listed.

The city assessors placed an assessment value of $180,000 on the buildings and $29,350 for the land. The property located in Waterville was formerly occupied by the Beardsley & Wolcott Manufacturing Co.

From this assessment an appeal to the superior court was taken and the case was referred to State Referee John W. Banks, former supreme court justice, for a hearing. He found the $29,350 assessment on land was proper but that the proper assessed value of the buildings should be $120,000 instead of $180,000.

Lumber Company Granted Cutting Rights

Status and Supplies of Pulp Mills Not Affected By the Grant of Cutting Rights of 700 Square Miles of Pulpwood Limits To Great Lakes Lumber Co. — May Probe Cutting Grants — Other News.

[FROM OUR REGULAR CORRESPONDENT]

TORONTO, Ont., Sept. 23, 1940—Lumber cutting rights on approximately 700 square miles of pulpwood limits in the Lake Head area have been granted to the Great Lakes Lumber Company, Premier Mitchell Hepburn announced last night.

"It is the government's duty to provide raw materials for lumber mills," the Premier had said, prior to the making of the agreement, when commenting on objections from the Port Arthur city council.

The agreement, it is understood, was the subject of a prolonged study at a meeting of the provincial cabinet yesterday. Certain details are yet to be worked out.

The Great Lakes Lumber Company is headed by E. E. Johnson and the agreement has advanced to the point where Mr. Johnson may commence operations, the Premier stated, following yesterday's meeting.

The Premier described as "absurd" the claim made by Charles Cox, Provincial member and Mayor of Port Arthur, in opposing the deal, that it involved 6,000,000 acres.

"It is made up of only some 700 square miles or 448,000 acres," the Premier said. "Approximately 20 per cent of the stand is suitable for cutting for timber. Why it is only a postage stamp compared with the size of that vast empire of the north."

Status of Pulp Companies Not Affected

The Premier reiterated that the agreement gave to the Great Lakes Company permission only "to take sawlogs of a size which cannot be economically used in the production of newsprint." It did not affect, he said, the status or supplies of the pulp companies which occupy the area in question. It provided, in effect, for a complete utilization of all forest wealth, at a time when market demands, arising from the war, made it feasible to harvest all available mature timber.

The company owns a $350,000 sawmill, erected during the past year at Fort William.

May Probe Cutting Rights

Inquiry into the management of Ontario's timber resources will be pressed immediately before the Council of Port Arthur in protest against the granting of sawlog cutting rights over pulpwood limits. Alderman G. J. McComber of that city said in a recent statement.

The alderman was in Toronto following an interview with Hon. C. D. Howe, Federal member for the riding. Earlier, he and Charles Cox, Provincial member and Mayor of Port Arthur, carried their protests to Premier Hepburn and Cabinet members.

Alderman McComber, in his statement, said it was "significant" that Hon. Earl Rowe, "president of the Great Lakes Paper Company, which company is a shareholder in Great Lakes Lumber Company, is definitely opposed to the granting of rights in the way they have been and personally appeared with others in protesting to the Premier and other Cabinet members."

He charged that the resources of the northwestern districts have, apparently, been used for political purposes . . . obviously been exploited and wantonly handled around by politicians and their friends; they have been dissipated without regard to proper cutting control.

"The people of Northwestern Ontario never had more reason for considering cession from Eastern Ontario, whereby they might better conserve and save our assets from ultimate elimination," the alderman continued. "The future of a $40,000,000 industry is being jeopardized by a concession given the promoters of a relatively unimportant sawmill scheme."

Investment in Newsprint Industry Large

The public investment of savings in Canadian newsprint manufacture is greater than in any other of our industries except the railways and hydro-electric plants and no manufacturing industry employs so many persons.

Of the total sales of newsprint this year by Canadian mills, amounting to $160,000,000, nearly all of it comes from outside Canada, but is spent within the Dominion, mainly in the form of wages, electric power, freight costs, taxes and the purchase of materials from a multitude of factories.

Paper Big Factor in Exports

Contributing in no small measure to the increase of nearly 47 per cent in Canada's exports of $110,548,000 for August, were paper and paper products to the value of nearly $11,000,000 to the United States, compared with about $8,000,000 last year and about $11,500,000 worth of wood and paper to the United Kingdom, compared with $6,082,000, a year ago.

Stays Box Firm Sentences

Chief Justice Robertson has issued an order allowing a stay, pending appeal, of sentences imposed on H. J. Badden and 19 manufacturers of containers and container materials in Canada, as reported in these columns in our September 12 issue.

The offending paper box companies were found guilty by Mr. Justice Hope of violating the Combines Act and fined $161,500 in all.

The stay was granted on condition that they either pay into court the amount of the fines or give satisfactory security.

Newsprint Resources Highly Important

How Canada's newsprint resources are helping, in no small measure to finance the vast expenditures of the European conflict is pointed out by the Huntsville Forester, which says that during 1940 newsprint manufacture will draw enough cash from United States customers to distribute in Canada an equivalent of fifteen dollars for every man, woman and child.

Chicago Paper Merchants More Optimistic

Spurt In General Retail Sales Expected To Result In Improvement In Demand For Paper — Paper Traffic Increases On Illinois Waterway — Reserve Reports Favorable On Wisconsin Mills.

[FROM OUR REGULAR CORRESPONDENT]

CHICAGO, Ill., September 23, 1940—More definite response to general business betterment is noted in the Chicago paper market this week despite lack of any more than general information. Retail sales in this area have jumped up materially with last week, with department store sales the third highest in the entire twelve months period. Slowly this betterment is permeating the paper jobber shelves and printers have indicated a more specific planning of advertising and direct mail campaigns.

The waste paper market remained comparatively firm during the entire week with some of the higher grades indicating a pronounced upward trend. In other lines eyes were toward both the New York and Chicago meetings of the industry, the latter, next week, expected to have some definite effect on the general situation as manufacturer, sales representative and jobber get together to analyze the current situation. Kraft was little changed during the week though the undertone was reported improved. Sulphites showed some uneasiness because of a lack of definite trend. Books and covers were reportedly unchanged but there were sufficient comments to indicate some increase in both the size and quantity of orders. Groundwoods and newsprints had a fair week though unseasonable weather and hesitancy for other reasons likewise took their toll of business. There remains a definite opinion that the market is due for fundamental upward movements because of a number of varying reasons including the low inventories being reportedly carried by the entire buying trade.

Paper Traffic Up on Illinois Waterway

A decided increase in "paper traffic" on the Illinois Waterway is indicated in a recent report made on total freight traffic on the Illinois Waterway for 1940 by Carten Jenkins, Illinois Chief Waterway Engineer. Mr. Jenkins said that "we have noted a decided increase in the paper traffic. Some newspapers are now buying their newsprint in the southern States and are having it delivered by barges." Tonnage on the Illinois river between Grafton and Lock port was reported as 46 per cent higher, January 1 to June 30, 1940, than for the first six months of 1939. Combined upstream and downstream tonnage for all commodities is reported as 1,550,505 tons in the first half of 1940 as compared to 1,061,406 tons in the first six months of 1939. Paper shippers will be interested to know that several of the loading points along the waterway have been materially improved during the past twelve months according to Mr. Jenkins.

Armstrong Heads Draft Board

A well known Chicago paper executive, Paul G. Armstrong, vice president of Parker, Thomas & Tucker, Chicago paper jobbing company, has been appointed by Governor Horner as State director of the selective draft division. Mr. Armstrong, widely known in paper trade circles, is a Republican, non political in background and at the present time is commander of the Illinois department of the American Legion. Immediately upon returning from the American Legion Convention in Boston this week, Mr. Armstrong will open offices in Springfield to oversee the huge job of registering Illinois citizens eligible under the conscription law recently approved by the Federal Congress.

Wisconsin Paper Mills Publicized

The Chicago press paid a great deal of attention this week to reports of materially improved business in the paper and pulp industry of Wisconsin. Through the Chicago offices of the Federal Reserve District come statements indicating that these mills are enjoying their best year since 1920. Price increases on top of a continuation of last year's high tonnage sales have brought a sharp increase in dollar shipments by virtually all of the principal mills in the State. Companies reporting to the Bank show aggregate gains over a year ago for the first seven months of 1940 as follows: new orders—4.8 per cent gain in tonnage and 11.3 per cent gain in dollar volume. Shipments—4.8 per cent gain in tonnage and 14.5 per cent in dollar volume. Production—7.2 per cent gain in tonnage. The aggregate profit gain for Wisconsin paper companies has probably been at least as great as the increase in the dollar shipments although higher taxes and costs of raw materials and supplies have been an offsetting factor, it is stated. The greatest improvement in earnings has generally been felt by the integrated companies which produce their own pulp requirements.

For Better Rag Rate to Canada

On September 10th an important conference was held at the offices of the National Association of Waste Material Dealers, Inc., in New York for consideration of a proposal the Association is endeavoring to get the railroads to agree to covering rates on rags to Canadian points.

Recently a proposal was made by the carriers to cancel practically all commodity rates into Canada and in opposing such a proposal the representatives of the Association suggested that the Canadian and American carriers entertain a joint proposal which the Association would make asking for a basis of 27½ per cent of first class with a 30,000 pound minimum in place of the present rates both class and commodity.

The association having found members of the trade in hearty accord with its suggestion, a formal proposal asking for the lower rates has been submitted to the committees representing both the American and Canadian railroads. If this proposal is approved it would reduce the present rate by about 2½ cents per hundred pounds below the present rate.

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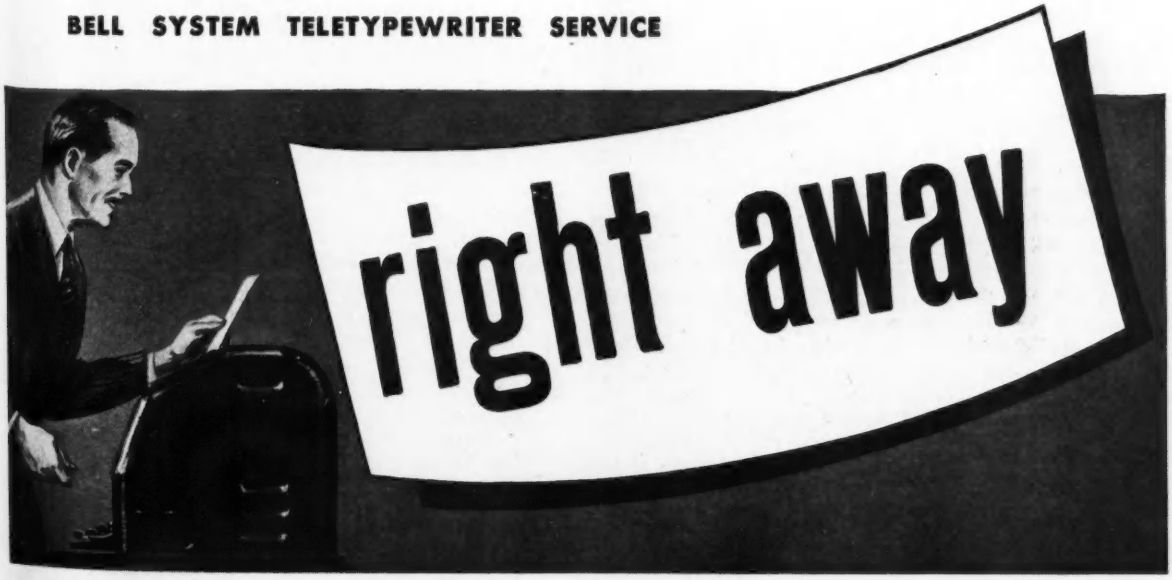

Paper Men Discuss Important Trade Topics

Sixty-Two Paper Merchants Present At Dinner of Philadelphia Trade Association and Discuss Important Matters — Talks Include Problem of Credits Created By Conscript Act — Other News

[FROM OUR REGULAR CORRESPONDENT]

PHILADELPHIA, Pa., September 23, 1940—In consonance with the program as outlined by the newly organized Planning Committee of the Philadelphia Paper Trade Association, sixty-two merchants met at dinner in Kugler's Restaurant on Thursday evening last. Nate Saxe, president of the Association, presided. After comparing conditions in the paper trade with national defense of the government, Mr. Saxe emphasized the need for harmonious working in the trade, pointing out that as Americans, irrespective of creed, race or religion, anything that was done to help the industry would also redound to the good of the country. President Saxe then turned the meeting over to George K. Hooper, president of Hooper Paper and Twine Company, the Philadelphia Paper and Cordage Association, and chairman of the Planning Committee. Chairman Hooper described in detail the credit bureau as set up by executive secretary Wm. A. Meeks of the Typothetae of Philadelphia and presented a plan offered by Mr. Meeks to members of the Association, explaining that from now until March 1st, 1941, by paying $5.00 a month to the Typothetae the members would be furnished with a list of classified names each month and would also be entitled to have access to all the information the Typothetae has on hand.

Talks by Prominent Paper Men

Wm. B. Killhour, president of Quaker City Paper Company, and immediate past president of the Philadelphia Paper Trade Association, was introduced by Mr. Hooper. In his talk, Mr. Killhour stressed the need for credit protection, pointing out the benefits of membership in the Association and the value of credit protection.

Butler Smythe, president of J. L. N. Smythe Company, and also a past president of the Philadelphia Paper Trade Association, after being presented by chairman Hooper, said in part: "We are approaching some very different and interesting times ahead although some of us, as usual, will get hurt as we pass through them. Just look back one year and if so much can happen in Europe to disrupt their business, what might possibly be the reaction here? It really isn't improbable that we may be actually at war soon. We will certainly lose some of our younger employes to selective draft. How much better it is, therefore, for us to meet together, exchange views, and in doing that cut out the 'yesing' contests we have encountered in the past. Our previous 'yeses' always lacked sincerity. Maybe we are afraid of calling a spade a spade, because some one gets insulted, packs up his cards and won't attend meetings. True, we can't have worthwhile meetings without full attendance, but we need more than a full attendance from now on. We need Nat Saxe's leadership and a wholehearted desire to support him outside the meetings as well as clapping hands to him here."

Ed. Walter Explains Credit Problem

Ed. Walter of Wilcox-Walter-Furlong Paper Company, explained the problem created by credits, adding that in selling merchandise unless one gets his money he is a great deal worse off than if he didn't make the sale; if you did not make the sale you would at least have merchandise, and this he said is where the value of whole-hearted response from members lies. In other words, meet around the festive board and have open discussions and everybody put his cards on the table. In this way we have been able to build up the confidence that we enjoy not only in Pennsylvania but throughout the entire United States.

LeRoy Bishop, treasurer of the Association, and J. R. Howarth, president of J. R. Howarth Paper & Twine Company, commanded the attention of all those present by their very illuminating talks on statistics and benefits derived from membership in the Association. Mr. Bishop presented some vital statistics compiled by him, and harkened back to the days of 1930 and 1931 when the fine paper division used to have a credit committee that reported to the National Association. Mr. Howarth cited his own experience before becoming a member of the Association, explaining his disgust with many things that came up in the fine paper activities for the past year, and his determination not to send in his check for membership dues, but said he: "Gentlemen, after hearing the various talks tonight, my check goes forward to you tomorrow."

Paper and Cordage Association Meets

The Philadelphia Paper and Cordage Association held its first meeting for the fall season at Adelphia Hotel on Friday, Sept. 20th, with luncheon at noon. President George K. Hooper announced that the Association had hit an "all high", boasting of 112 members, the largest in the history of the Association. The gap between this total and the limit of 125 members, which is the maximum number that the Association will accept, is expected to be filled in a very short time and an invitation to all those desiring to get under the rope is extended.

In summarizing the activities for the fall season, president Hooper announced the seventh and final golf tournament for 1940 season at Pine Valley on Wednesday, October 9th; and the always looked forward to Christmas Party for children from the Salvation Army, which is scheduled to be held this year on or about December 20th.

Announcement was also made of the newly organized bowling team of the Paper and Cordage Association which has entered the Paper Trade Bowling League. W. B. Peterson of Spangler Envelope Company, is captain of the team and it is his proud boast that the team won the first four out of five games in the first evening's play.

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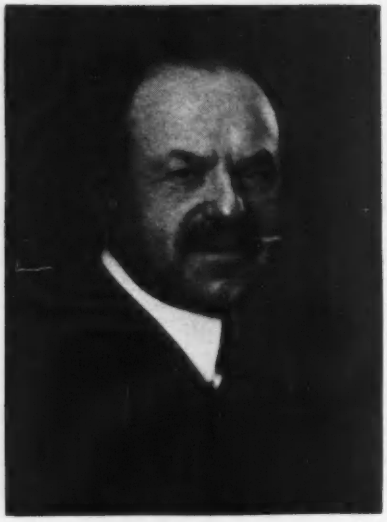
Obituary

Ernst R. Behrend

Ernst Richard Behrend, president of Hammermill Paper Company, since its founding in 1898, died at his home near Erie, Pa., on Sunday, September 22, of a heart ailment. He was 71.

Death came to Mr. Behrend, one of the best known figures in the nation's paper industry, after an extended illness which had prevented his active participation in the affairs of the Company for the past year.

Mr. Behrend was born on Easter Sunday, March 29, 1869, in Coeslin, Germany. He studied at polytechnic institutes, first at Dresden and later at Charlottenburg. He served in the Prussian mounted ar-



ERNST R. BEHREND

tillery and was honorably discharged as a lieutenant.

Arriving in the United States in 1896, he went to work first as draftsman and engineer at Pusey & Jones Company in Wilmington, Delaware.

In 1898, Mr. Behrend in conjunction with his father, the late Mr. Moritz Behrend, and his brother, Dr. Otto F. Behrend, founded the Hammermill Paper Company in Erie. It was the first all-sulphite mill in the United States devoted to the manufacture of writing papers.

Mr. Behrend became an American citizen in 1902. He took a very active part in the civic affairs of Erie and during the World War was active in the home defense of his country. He was a member of the Erie War Activities executive committee and a "four minute" speaker. For these and other activities he was honored in 1929 by the American Legion, Department of Pennsylvania, and became the only Erie citizen to receive the Legion's Distinguished Service Certificate.

His interests extended beyond community affairs. He was a member of the American Society of Mechanical Engineers, member of the Board of Trustees of the Institute of Paper Chemistry at Appleton, Wisconsin, and a member of the Board of Trustees of Deerfield Academy at Deerfield, Mass.

He was one of the founders of the National Industrial Conference Board and was recently elected a vice-chairman.

Mr. Behrend's contributions to the paper industry were many. In addition to pioneering in the manufacture of paper by the sulphite process, he was the inventor of high speed watermarking, a process extensively used today. He was among the first to use super-heated steam and pioneered in the use of boiler feed water purification. His company imported the first poppet valve Lenz steam engine and introduced the first Bellmer bleachers into this country's paper industry.

He lived to see the tiny plant he founded forty-two years ago grow into an internationally known company with representatives all over the world.

He is survived by his widow, Mrs. Mary Brownell Behrend, whom he married in 1901; his daughter, Miss Harriet Ellen Behrend; his sister, Mrs. Henriette Brust; his brother, Dr. Otto F. Behrend, treasurer of Hammermill; and his brother in law, William T. Brust, all of Erie.

Edward C. Worden

Edward C. Worden, consulting chemist, who was head of the Worden Laboratory and Library at Millburn, N. J., died in his sleep at his home early Sept. 22nd. He was 65 years old.

Mr. Worden was born in Ypsilanti, Mich. Soon after graduating from the School of Pharmacy at Ann Arbor, Mich., Mr. Worden came to New York, where he nearly starved. For a time he sold pills. An unsuccessful venture as a member of a firm of consulting chemists finally ended when a hose slipped off a faucet in the laboratory and the resulting flood ruined the pianos in a showroom underneath. Then he took a small position with a celluloid manufacturing company in Springfield, N. J., and this connection led to the years of research that made him an authority on cellulose chemistry, and the author of several volumes on the subject.

In the midst of his other work Mr. Worden managed to obtain the degree of B. S. in 1907 from New York University, which gave him an M. A. two years later, and an honorary Doctorate of Science in 1921. He was chemist for the Clark Thread Company of Newark from 1902 until the establishment of his own laboratory at Millburn in 1914. During the last two years of the World War he was chief of the airplane wing-coating section of the Bureau of Aeronautics. In the service of the government he had made fourteen crossings of the Atlantic.

Mr. Worden owned a notable stamp collection. The value of the United States issues has been placed as high as $500,000. He was a member of the Chemists Club of New York, Racquet Club of Washington, Masons, 32d degree, and several professional societies. With his son, Edward C. 2d, he edited the "Technical Dictionary of Chemistry."

Surviving are his widow, two sons and two daughters.

Vernon C. Scott

Vernon C. Scott, 52, president of the Packer-Scott Company, Portland, Ore., general paper merchants wholesale paper firm, died September 10 in Portland Medical hospital. He had been in poor

health two years and in the hospital more than a week.

Surviving are his widow, Lucille; two children, Joanne and Vernon Jr. of Portland; a sister, Kathryn, and a brother, Dr. Vinton Scott of Salem.

Mr. Scott was born in Nebraska. He had engaged in the paper business here more than 20 years. Funeral services will be arranged at Holman & Lutz.

Dr. Frederik Jahn

The PAPER TRADE JOURNAL has been informed by Bowmall & Company, Inc., that a cable was received in New York today announcing the death on Sunday, September 22, of Dr. Frederik Jahn, managing director of the Swedish Paper Mill Association, Stockholm, Sweden. As is well known, Dr. Jahn is one of the most widely known men in the industry.

Big Demand for Space at Chemical Show

With 43 per cent of the total space available already under contract, the show committee of the first annual National Chemical Exposition, sponsored by the Chicago Section of the American Chemical Society, to be held December 11 to 15 at the Stevens Hotel in Chicago, is facing the acute problem of not being able to accommodate all firms that plan to exhibit at the big show.

"It seems apparent that we have miscalculated the possibilities for the sale of space at this our first exposition," said Dr. R. C. Newton, chairman of the show committee. "We had anticipated that the available 32,000 square feet would be adequate to meet all demands, but inquiries indicate that it will be insufficient to take care of all firms that would like to be represented.

"Up to the present we have placed no restriction on the amount of space requested by single exhibitors, but the show committee is seriously considering the necessity of setting a limit in order that many firms will not be disappointed."

Dr. Newton reports that 68 per cent of the space assigned has been contracted for by firms that manufacture chemicals or laboratory apparatus related to chemical research. The other 32 per cent has been allotted to equipment manufacturers.

"In our original plans we provided space for 300 single exhibitors, but some of the major manufacturers are demanding multiple units with the result that there is a threatened shortage of booths for many who will delay in making application," said Dr. Newton.

The show committee also reports that aside from inquiries from prospective exhibitors, there is every assurance, judging from correspondence reaching headquarters at 110 North Franklin street, Chicago, that the exposition will draw thousands of chemists, engineers, production managers, plant superintendents, foremen, purchasing agents and industrial executives from all sections of the United States and Canada.

Exhibitors have been urged to stress the extraordinary properties of materials or uses of equipment, in order that the show will be strictly in tune with the objectives of the Chicago Section of the American Chemical Society to foster chemistry and its application. They have also been asked to send their best technical talent to describe the properties of products to be exhibited in their booths.

Turns To U. S. for Old Newspapers

WASHINGTON, D. C., September 25, 1940—Recent improvement has occurred in the generally unfavorable economic conditions prevailing in Burma since the summer of 1938, according to a report from the American Consulate, Rangoon, Burma. Within the past few months there has been a noticeable increase in the volume of business transacted and in the movement of goods. There is reason to believe, furthermore, that recent increases in rice prices, which constitute the basis of the economic structure of the country, may stimulate purchasing-power and accelerate trading in the near future. There is, on the other hand, a feeling of uncertainty among merchants as to the effect hostilities in Europe may have upon business in Burma. For this reason there is a tendency on the part of merchants to await developments before making heavy commitments.

Until recently, supplies of old and overissue newspapers in Burma were secured chiefly from Great Britain and to a lesser extent from the United States. There is a local preference for British paper because it is of a comparatively heavier type and contains only a small proportion of colored sections, which are not desired by importers in Burma in excess of three percent. However, because supplies from Great Britain have been difficult to obtain within recent months, importers are turning to a greater extent to American sources of supply. Some Chinese paper has been introduced into the market recently but has not met with favor because of its inferior quality. Within recent months local prices of old and overissue newspapers have increased materially.

Dillard Paper Co. Amends Charter

GREENSBORO, N. C., September 23, 1940—Dillard Paper Company, one of the largest distributing paper houses in the south which recently acquired the Roanoke Paper company, has amended its charter, according to certificate of amendment filed Thursday in clerk's office of Guilford Superior court.

Certificate shows that at a special meeting of the stockholders September 14 a resolution was unanimously adopted authorizing a change in capital stock from 1,000 shares of common stock of $100 par value to 4,000 shares of common and 1,000 shares of preferred stock, both of $100 par value.

The preferred stock will be entitled to cumulative dividends of 6 per cent annually but not entitled to share in profits of the corporation or to exercise voting power. In event of liquidation or dissolution of the corporation the preferred shares shall be paid in their par value plus accumulated dividends before any amount is paid to holders of common stock.

Preferred stock is redeemable at option of the corporation on any anniversary date of issue at $105 per share plus accrued dividends.

Recent addition of the Roanoke company brought to four the number of plants owned by the Dillard firm. A branch was established in Greenville, S. C., in 1934, following opening of the firm here in 1926. Another branch was opened in Charlotte in 1937.

New TAPPI Members

The Executive Committee of the Technical Association of the Pulp and Paper Industry have elected the following to membership:

Barchman A. Bannon, manager and secretary, Western Gear Works, Seattle, Wash., is a graduate of the University of Santa Clara in mechanical engineering.

Charles Bassemir, chemist, Container Corporation of America, Manayunk, Pa., is a 1940 graduate of the New York State College of Forestry.

Marcus K. Bryan, consulting engineer, Chas. T. Main, Inc., Boston, Mass., is a 1910 graduate in mechanical engineering of the University of Pennsylvania.

Edwin F. Burns, chief engineer, International Paper Company, New York, N. Y., is a 1916 graduate of the Rochester Athenaeum-Mechanics Institute.

John G. Callan, Jr., in charge of paper mill instrumentation, the Foxboro Company, Foxboro, Mass., is a 1934 graduate of the Massachusetts Institute of Technology.

Paul B. Corning, plant engineer, International Paper Company, Palmer, N. Y., is a 1927 graduate of Cornell.

Robert M. Stuart, formerly of the Sutherland Paper Company is now with the Northern Paper Mills, Green Bay, Wis.

F. A. Steele, formerly of the C. K. Williams Company, is now research chemist for the Minnesota Mining and Manufacturing Company, St. Paul, Minn.

D. D. Reeve, formerly with the Quebec North Shore Paper Company, is now a draftsman for the Aluminum Company of Canada, Avida, Que.

Herbert W. Rowe, formerly of the Institute of Paper Chemistry, is now a technical assistant for the Nekoosa-Edwards Paper Company, Port Edwards, Wis.

Harold Sinclair, formerly technical advisor of Bennett, Inc., is now with the American Cyanamid and Chemical Corporation, Kalamazoo, Mich.

William Bond Wheelwright, formerly editor of *Paper and Printing Digest,* is now with Callaway Associates, advertising counsellors, Boston, Mass.

Charles H. Wilson, Jr., formerly of the University of Maine, is now asst. chemist for the Esleek Manufacturing Company, Turners Falls, Mass.

Carmin P. Donofrio, laboratory technician, New York State College of Forestry of which he graduated in 1939.

Clayton Ewing, president, Falls Paper and Power Company, Oconto Falls, Wis., attended the Univ. of Wisconsin and was formerly with the Marathon Paper Mills.

Juan di Filippo, research director, Celulosa Argentina, Juan Ortiz, Argentina, is a 1936 graduate of the Univ. of Santa Fé.

Edmund A. Georgi, chemist, Hercules Powder Company, Wilmington, Del., is a 1928 graduate of Cornell.

Harry Hulmes, Jr., salesman, U. S. Rubber Company, Philadelphia was formerly with the Moore and White Company.

William Kosoff, plant chemist, the Upson Company, Lockport, N. Y., is a 1937 graduate of the New York State College of Forestry and was formerly with Lawless Brothers and the U. S. Forest Service.

Merritt Lawrence, manager, General Electric Company, Grand Rapids, Mich., is a 1919 graduate electrical engineer of the Univ. of Texas.

Allen T. Luey, assistant chemist, American Coating Mills, Elkhart, Ind., is a 1936 graduate of Dartmouth College and was formerly with the International Paper Company, Corinth, N. Y.

Edward K. Lum, chief chemist, the Beckett Paper Company, Hamilton, Ohio, is a 1923 graduate of the Univ. of Chicago and was formerly with the Chillicothe Paper Company and the Black-Clawson Company.

J. E. Parnell was erroneously reported to be a graduate of the Univ. of North Carolina. He is a graduate chemical engineer (M.S.) of the Univ. of Alabama.

U. S. Hardware & Paper Co. Expands

The United States Hardware and Paper Company Los Angeles, Cal. recently awarded contracts and construction has already started on a 100,000 square foot office and warehouse building representing the first unit to be constructed on the firm's tract of land consisting of approximately 5 acres located at the northeast corner of 26th and Soto streets. This property was purchased in April, 1940.

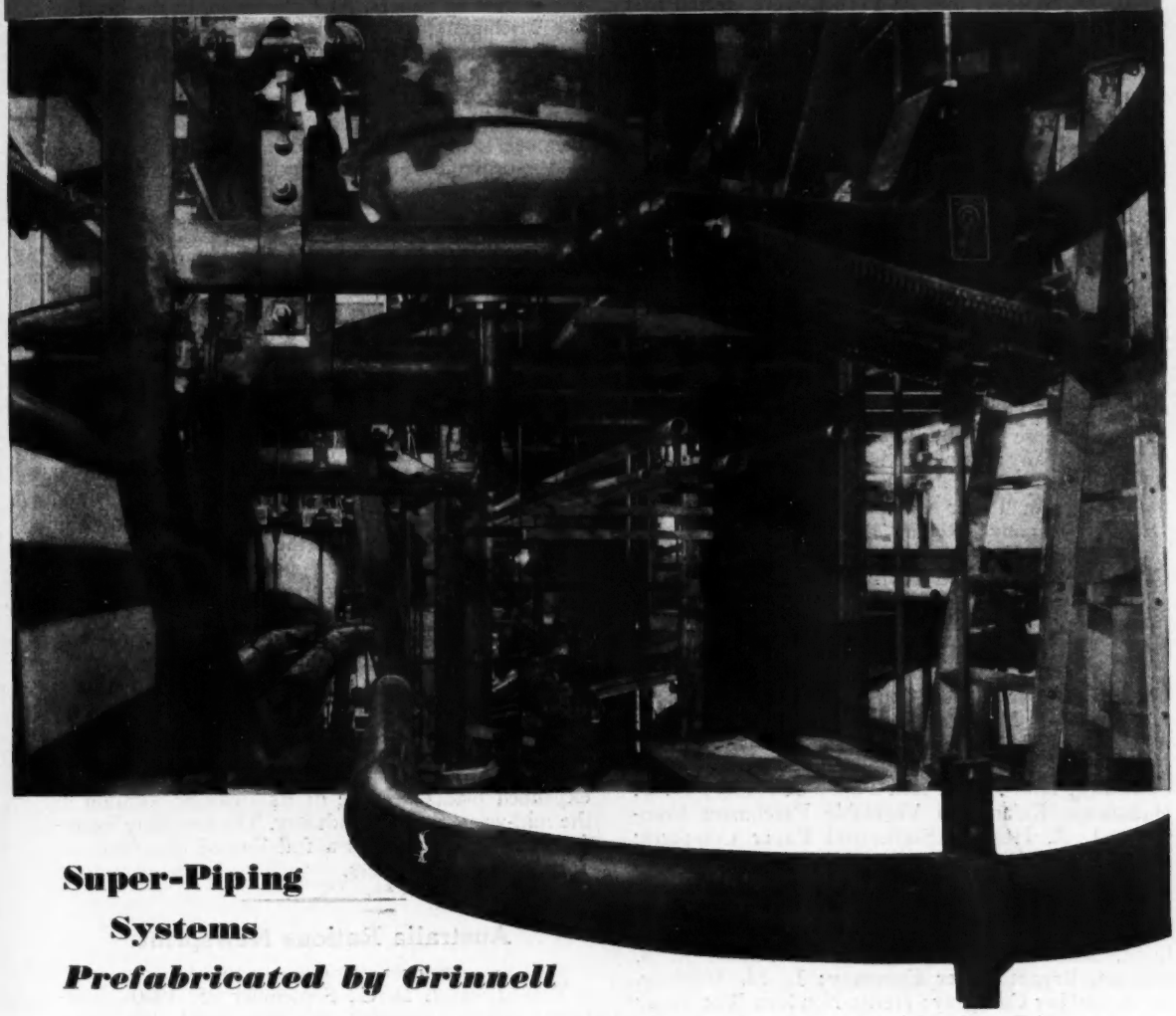
The building is to be of concrete construction throughout and will be modern in every detail. Every conceivable facility has been provided to handle efficiently the firm's rapidly increasing volume of business. Ample sky-lights will be provided throughout the entire office and warehouse sections in order to provide ample light so as to reduce to the lowest minimum the use of artificial electric lights. Due to the tremendous volume of merchandise that is received and shipped, it has been necessary to provide facilities to accommodate 5 rail box cars and 20 large-size trucks at one time. This will greatly facilitate the numerous in and out transactions handled daily by the firm and will substantially reduce any excess cost of handling its merchandise in and out.

The outside design will be streamlined throughout in a very artistic architectural design. The plans and specifications were prepared by Marcus P. Miller, a prominent Los Angeles architect who has designed many large buildings in Southern California. General contract has been awarded to H. Gorelnik Company who will employ hundreds of skilled union tradesmen during the construction of this building.

After completion of this first unit of 100,000 square feet, which is scheduled on or about January 1, 1941, the firm will then make plans for the construction of units 2 and 3 which will comprise an additional 150,000 square feet of floor space and will round out the expansion program contemplated. With the completion of units 1, 2, and 3, the entire building project together with the cost of the land will represent an investment in excess of $300,000.

In laying out the plans for the erection of the first unit, every consideration was given to modernization and improving working conditions for the firm's employees, who will total in excess of 150 shortly after the firm occupies its new quarters. Many conveniences have been provided for the firm's employees such as stall showers with hot and cold running water, locker rooms, dining room, and many other added conveniences which will rarely be found in many establishments of a similar nature throughout the entire West.

TAILOR-MADE "HARNESS" TO TAME HIGH PRESSURES



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WHENEVER **PIPING** IS INVOLVED

A. J. Weller Heads Mich. Superintendents

[FROM OUR REGULAR CORRESPONDENT]

KALAMAZOO, Mich., September 20, 1940—Arnold J. Weller of the Sutherland Paper Company was elected chairman of the Michigan Division of the American Pulp and Paper Mill Superintendents' Association, at the first fall meeting, held at the Park-American Hotel, Thursday evening September 19, 1940. H. Nendorf and Al Perlick were elected first and second vice chairmen respectively and Glen Sutton also of the Sutherland Company was elected secretary and treasurer. Retiring secretary Al Perlick's annual report recounted a successful year of activities and showed the Division in a sound financial condition. Past President Ray Barton, and a National officer, addressed the meeting and explained the functions of the newly appointed advisory board of which he is a member. Through the courtesy of the Williams Gray Company, A. F. Crossman of the Lindsay Wire Weaving Company was the speaker. His talk was accompanied by several rolls of motion film showing in detail the complete manufacturing operation of a Fourdrinier wire.

Mr. Crossman's familiarity with his subject and the most excellent film, afforded an evening of instructive entertainment.

Among those present were: W. H. Astle, Michigan Paper Company; Ralph Atkins, Lee Paper Company; Barney Benson, Williams Gray Company; R. L. Barton, Michigan Paper Company; L. H. Brenfogle, Draper Company; Robert Buss, Hercules Powder Company; A. F. Crossman, Lindsay Wire Weaving Company; A. W. Cole, B. J. Cole, Rex Paper Company; S. V. Cottrell, National Aniline and Chemical Company; F. L. Chappel, Sutherland Paper Company; Paul de Guehry, Michigan Paper Company; F. B. Eilers, Orr Felt and Blanket Company; J. J. Ely, Peninsular Paper Company; M. S. Fogerty, J. F. Fielding, Michigan Paper Company; L. S. Farrel, Wallace & Tierman Company; Chas. Gardner, Lee Paper Company; L. L. Griffin, Williams Gray Company; Hod Heath, Rex Paper Company; W. F. Hathaway, Kalamazoo Vegetable Parchment Company; J. A. Heenan, Sutherland Paper Company; H. B. Johnston, Allied Paper Mills; L. J. Kimball, Improved Paper Machine Company; M. J. Klein, Wallace & Tierman Company; Lester La Liberle, Kalamazoo Vegetable Parchment Company; L. J. Lynd, Sturdevant Company, Boston, Mass.; A. B. Milham, Bryant Paper Company; L. M. Monreig, W. S. Rubber Company; Herne Nendort, Rex Paper Company; Al Perlick, Kalamazoo Vegetable Parchment Company; J. Parent, Noble & Wood Machine Company; W. J. Plank, Plank Company, Appleton, Wis.; Harry Pearson, Pioneer Paper Stock Company; A. D. Rosnes, Continental Diamond Fibre Company; Douglas Robbins, Robbins Company; J. L. Russre, Bryant Paper Company; G. C. Schmid, Michigan Paper Company; L. Starck, McCluskey & Sons Inc.; Carl Swanson, Allied Paper Mills; R. B. Stewart, Kalamazoo Vegetable Parchment Company; F. K. Shankweiler, Hercules Powder Company; C. B. Smith, Huron Milling Company; Glen Sutton, Sutherland Paper Company; W. S. Taylor, American Cynamid and Chemical Corporation; Jess Wright, A. M. Meincke Company, and J. A. Wise, Kalamazoo Paper Company.

American Cyanamid Adds Units

The American Cyanamid and Chemical Company, 30 Rockefeller Plaza, New York City, is adding two new units to its plant on Miller Road, Kalamazoo, Mich., L. R. Verdon, manager, announced last week. One of the new units will manufacture wax sizes for the paper industry under patents recently acquired from Bennett, Inc. The second will prepare casein for use in coating papers. At Kalamazoo, in the heart of the Michigan paper making district, the company's present plant produces sulphate of alumina and serves as a distributing point for its full line of paper making chemicals.

Wax sizes, to be produced in the new unit after October 1, impart water and ink resistance to paper and improve its surface for printing or writing. They also make box board scuff-resistant and give finish to wall board. Coated papers are sized before the coating is applied and most paper specialties are sized. As compared with rosin sizes used for similar purposes, wax sizes yield a more flexible sheet with higher resistance to water. Sizes are used in making most grades of paper. Wax sizes are supplied in emulsion in water and can be put into the fibers in the beating process before the sheet is formed or applied to the finished sheet.

Wax sizes have been made by Bennett, Inc., since 1927 when that company's operation first expanded to the United States from Canada. Manufacture is being continued at Lawrence, Mass., The acquisition of the size business of Bennett, Inc., by American Cyanamid Company places the efficient research and development group of Cyanamid behind this relatively new and highly promising tool of the paper industry.

The new casein grinding plant at Kalamazoo will prepare this product of the dairy industry for use in paper mills. Raw casein from the dairying regions of Wisconsin, Minnesota and the Pacific Coast will be ground and blended in the new plant to provide a uniform product for paper coating.

Kalamazoo was chosen by American Cyanamid and Chemical Company as the site for its present and expanded plants because of its strategic location in the mid-western paper industry. The company manufactures and distributes a full line of chemicals required by paper makers.

Australia Rations Newsprint

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., September 25, 1940—Commonwealth Government has announced that newsprint is being rationed in Australia, according to a report from the American Consulate, Sydney, Australia. The quantity of newsprint which may be used in the production of any publication is a certain percentage of the actual quantity consumed for the same purpose during the year ended June 30, 1939.

The percentage reductions which will be applied on and from July 1, 1940, vary with the class of publication. The most liberal treatment will be accorded to provincial daily papers of 24 pages and under per week, which will be exempt from any percentage reduction. The most drastic restriction will apply to daily papers exceeding 72 pages per week, Sunday papers exceeding 48 pages, and weekly papers exceeding 28 pages, in which cases the reduction will be 35 per cent. All calculations are on a broadcast basis.

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R. A. Fife Speaks on Tissue Issue

At the recent annual meeting of New Jersey Weights and Measures Officials in Atlantic City, Ross A. Fife, executive secretary of The Tissue Association spoke briefly on the problem of the proper marking of rolls of toilet tissue. This problem arose from action taken at the last National Conference of Weights and Measures Officials held in Washington, D. C. June 3, 1940.

At that time resolutions were passed advocating that the contents of all rolls of toilet tissue be indicated by count (number of sheets) and also that all wrapping papers be sold by weight only. These resolutions are in direct conflict with long established and satisfactory practices in the tissue paper industry where for over fifty years roll toilet paper has been sold by either count or net weight and wrapping tissue has been sold by ream count.

Mr. Fife, who has recently been in contact with weights and measures officials throughout the Country, particularly in connection with roll toilet labeling, had been asked to address the meeting on "The Tissue Issue." In his remarks he not only explained briefly how the problem of marking roll toilet tissue is being worked out cooperatively with weights and measures officials, but also emphasized the desirability of closer cooperation between these officials and associations of paper manufacturers.

E. W. Tinker, executive secretary of the American Paper and Pulp Association and the executive secretaries of the various divisional groups affected are working with Alex Pisciotta of New York City chairman of the Legislative Committee of the National Conference in the solution of the problem of the proper marking of wrapping paper of all types. Mr. Pisciotta who is always receptive to constructive cooperation has suggested a conference of his committee and representatives of the paper industry and it is felt that such a conference will be of direct benefit to all concerned. Arrangements for this conference are being made by Mr. Tinker.

Government Paper Bids

WASHINGTON, D. C., September 25, 1940—Government Printing Office has received the following bids for 5,859 pounds (126,000 sheets) of 50 per cent rag, 21 x 32 blue bond paper; Walker Goulard Plehn Company, 18.40 cents less 2 per cent; Cauthorne Paper Company, 19.40 cents; Old Dominion Paper Company, 15.24 cents; Paper Corp. of U. S., 12 cents; Virginia Paper Company, 15 cents; Mudge Paper Company, 14.84 cents; Mathers-Lamm Paper Company, 15 cents; Stanford Paper Company, 15 cents; and Barton, Duer & Koch Paper Company, 14.50 cents.

For 5,000 pounds (18,000 sheets) of 50 per cent rag, 22½ x 28½ buff index paper; Barton, Duer & Koch Paper Company, 13.38 cents; R. P. Andrews Paper Company, 12.89 cents; Paper Corporation of U. S., 11.5 cents; Whitaker Paper Company, 14.45 cents; Mudge Paper Company, 14.4 cents; Old Dominion Paper Company, 12.73 cents; and Cauthorne Paper Company, 14 cents less 2 per cent.

For 7,500 pounds (2400 sheets) of No. 1 binders board, 25 x 34; R. P. Andrews Paper Company, 3.808 cents; Barton, Duer & Koch Paper Company, 3.93 cents; and Mathers-Lamm Paper Company, 3.8 cents.

Superfinish for Hancock Valves

"Once again we have borrowed a page from the automotive industry in order to produce better valves", announces the Hancock Valve Division of Manning, Maxwell & Moore, Inc., Bridgeport, Conn. The makers claim that through the use of the revolutionary development, superfinishing, the life of valve seats and discs in Hancock "500 Brinell" valves is increased twelvefold. Friction causes wear in automobile engines and friction also causes wear in valves. It is stated by the manufacturers that superfinishing produces a highly polished wearing surface by "honing" (actually rubbing and scrubbing with abrasives) which eliminates almost the last trace of friction.

It is also said that in numerous "breakdown tests" on valve-testing machines, the superfinished valve

SHOWING SPECIAL FINISHING MACHINE

seats and discs outlasted 12 times the same seats and discs that had not been superfinished.

Special superfinish machines have been developed expressly for Hancock. Close-up of one such machine applying superfinish to a Hancock valve disc is shown in the insert at the upper left of this picture. The makers say that every Hancock "500 Brinell" Valve is now being equipped with Superfinished seats and discs at no increase in price.

The makers also give credit to the automotive industry for the development of the diamond boring machine whose adaptation enabled Hancock to build the first commercial valve with stainless steel seats and discs of "500 Brinell" hardness.

A most interesting new bulletin describing Superfinished Hancock "500 Brinell" Valves is just off the press; a copy may be had by writing the manufacturers.

Manhattan Rubber Co. Expands

To provide needed additional space for storage and steadily expanding manufacturing facilities, Raybestos-Manhattan, Inc. has purchased the Brighton Mills plant adjacent to the main plant of the Manhattan Rubber Manufacturing Division at Passaic, N. J., according to an announcement made by F. L. Curtis, general manager.

The property includes approximately five and one-half acres on which are buildings with 240,000 square feet of floor space. It is situated on the Delaware, Lackawanna and Western Railroad.

The development of new rubber products and the wider use of rubber goods by several major industries has resulted in a steady growth of Manhattan's business, necessitating additional space.

FINANCIAL NEWS

New York Stock Exchange

High, Low and Last for Week Ending September 25, 1940

	High	Low	Last
A. P. W.	2	2	2
Armstrong Cork Co.	37	34	37
Celotex Corp.	7½	7	7⅜
Celotex Corp., pf.	57	53	57
Certain-Teed Products Corp.	5½	4⅜	5½
Certain-Teed Products Corp., pf.	33½	23½	33½
Champion Paper & Fibre Co.	22½	22½	22½
Champion Paper & Fibre Co., pf.	102	102	102
Congoleum-Nairn Co.	18½	17¾	18½
Container Corp. of America	14⅝	14	14⅛
Continental-Diamond Fibre Co.	6⅝	6	6½
Crown-Zellerbach Co.	16	15½	15⅝
Crown-Zellerbach Co., pf.	87½	86½	87
Flintkote Co.	16⅝	15⅞	16⅛
Robert Gair	3	2⅞	3
Robert Gair, pf.	14¾	13¾	14½
International Paper & Power	15½	14½	14½
International Paper & Power, pf.	60¾	57¾	59
Johns-Manville Corp.	70½	68¾	70
Johns-Manville Corp., pf.	....	....	....
Kimberly Clark Corp.	....	....	....
MacAndrews & Forbes	28½	28½	28½
MacAndrews & Forbes, pf.	129	129	129
Masonite Corp.	29¾	28	29¾
Mead Corp.	8⅞	8¾	8¾
Mead Corp., pf.	77	77	77
Paraffine Companies, Inc.	38½	38	38
Paraffine Companies, Inc., pf.	....	....	....
Rayonier, Inc.	17½	16½	17
Rayonier, Inc., pf.	29½	29	29½
Ruberoid Co.	16	15½	16
Scott Paper Co.	41⅞	41¼	41⅞
Scott Paper Co., pf.	114¼	113½	113½
Sutherland Paper Co.	24½	24¼	24½
Union Bag & Paper Corp.	12¾	11⅞	12¼
United Paperboard Co.	....	....	....
U. S. Gypsum Co.	80⅛	76½	80¼
U. S. Gypsum Co., pf.	174	174	174

New York Curb Exchange

High, Low and Last for Week Ending September 25, 1940

	High	Low	Last
American Box Board Co.	5	5	5
Brown Co., pf.	20½	19	20
Great Northern Paper	41	39	41
National Container Corp.	11½	10¾	11½
St. Regis Paper Co.	3	2¾	3
St. Regis Paper Co., pf.	71½	66	71½
Taggart Corp.	3⅜	3⅛	3⅜

Court Considers Abitibi Plan

[FROM OUR REGULAR CORRESPONDENT]

TORONTO, Ont., September 23, 1940—Yesterday the court was to hear representations from the bondholders' protective committee of Abitibi Power and Paper Co., and then determine on a reserve bid for the public sale to be held Oct. 16. Nothing could be learned today concerning the result of the court's sitting.

Time for depositing the bonds under the plan of the bondholders' protective committee for bidding in the properties on behalf of assisting bondholders expired at the close of business, Saturday, September 14. This was the first step towards completion of the plan of procedure as outlined by the committee in March, 1939.

Additional public interest has been aroused concerning the affairs of this company, chiefly through the pronouncements of Col. Geo. Drew, leader of the opposition in the Ontario Legislature, who claims that the central figure in the proceedings has been J. P. Ripley of New York. He recalls that the National City Co., of which Mr. Ripley was a member, sold a substantial part of the preferred stock on the assurance that "the net tangible assets, after deducting all liabilities, including funded debt and all prior securities, amount to more than ninety millions of dollars, as compared with $25.1 millions par value of 6 per cent cumulative preferred stock." Col. Drew adds that investors were persuaded to buy the preferred stock on this assurance.

Puget Sound To Expand

A strong market for unbleached sulphite wood pulp through 1941 is anticipated by Puget Sound Pulp and Timber Company owing to a world shortage for this particular grade of chemical pulp, Ossian Anderson, president of the company, says in a letter to stockholders. Explaining the company's plan for a plant addition which would raise its capacity of that pulp to 150,000 tons from 100,000 tons, Mr. Anderson says:

"An excellent market, both foreign and domestic, is now being enjoyed by the company, and it is the belief of the management that a strong demand for this particular grade of chemical pulp will continue through 1941 owing to a world shortage which has developed in spite of reduced consumption in some countries.

"This world shortage," Mr. Anderson says, "has been brought about in part by lack of any new construction of unbleached sulphite pulp mills in the last two years, by curtailment or elimination of production in Finland, and by increased cost of transportation from the Scandinavian countries which, together with blockades, has virtually eliminated any substantial shipments from these large producers, forcing shutdowns and drastic reduction in normal world supply and inventories.

"In the opinion of the management, a peace in Europe will mean that European countries will require large quantities of pulp which demand will, for some time, consume all or a major portion of the productive capacity of the Scandinavian countries, especially in view of the fact that it will take the Scandinavian countries some time to reach capacity operations due to interruptions in wood-cutting and disruption of transportation."

Soundview Earns $1,527,093

The Soundview Pulp Company for the eight months to August 31, reports a net income of $1,527,093, equal to $2.95 a share on common stock, compared with $208,425, or 26 cents a common share, for same period last year.

Simplex Declares Dividend

The Simplex Paper Company declared a dividend of 10 cents a share, payable October 1, record September 20. The previous dividend was 5 cents paid July 8.

Robertson Box Earnings Up

The Robertson Paper Box Company, Inc. for 1939 reports a net income of $88,094, against $74,078 in 1939.

CONSTRUCTION NEWS

Lufkin, Tex.—The Southland Paper Mills, Inc., manufacturer of newsprint, has plans maturing for expansion in mill, placed in service a few months ago, for large increase in present capacity. Work will consist of several new units for pulp and finished paper divisions, reported to cost close to $5,000,000 with machinery. Proposed to ask bids on general erection contract in near future. George F. Hardy, 305 Broadway, New York, N. Y., is consulting engineer.

Chicago, Ill.—Joseph O'Reilly has leased from the Lake-Peoria Building Corporation a one-story L-shaped industrial building at 914-18 West Lake street, extending through to 211-13 North Sangamon street, totaling about 10,000 square feet of floor space and will occupy the new plant for the manufacture of a new line of paper boxes and containers. It is proposed to have plant ready for service at early date.

Williamstown, Mass.—The Gevaert Company of America, Inc., 182 Cole avenue, manufacturer of special processed papers, films, etc., has awarded general contract to the Petricca Construction Company, 203 Pomeroy avenue, Pittsfield, Mass., for proposed new addition to plant, recently referred to in these columns, consisting of a three-story and basement structure, 61 x 92 feet. Work on superstructure will be placed under way at once. Cost reported close to $75,000, including equipment. Executive offices of company are at 425 West Fifty-fifth street, New York, N. Y.

Peshtigo, Wis.—The Badger Paper Mills, Inc., manufacturer of tissue and kindred paper stocks, waxed and other processed papers, has approved plans for new addition to mill, to be one-story, 160 x 240 feet, equipped for considerable increase in present capacity. It is reported to cost in excess of $100,000, with equipment. Contract for general erection has been let to Edward H. Meyer Construction Company, 75 Main street, Oshkosh, Wis., and work is scheduled to be placed under way at once.

Camas, Wash.—Crown-Willamette Paper Company, manufacturer of book and catalog papers, tissue and other paper stock, plans extensions in log pond fronting on sawmill, used for raw material supply, with extension of breakwater for about 125 feet on Camas Slough on the Columbia River. Application for permission has been made to the United States Engineer office at Bonneville, Ore. Proposed to begin work at early date. Company is a division of Crown Zellerbach Corporation, 343 Sansome street, San Francisco, Cal.

Brevard, N. C.—The Ecusta Paper Corporation, manufacturer of cigarette papers, will build an addition to power house and enlarge filter plant in connection with mill expansion, recently referred to in these columns. A new turbine-generator unit and auxiliary equipment will be installed, as well as boiler and other boiler-room equipment. Steel framing for these extensions will be furnished by the Carolina Steel and Iron Company, Greensboro, N. C. The Fiske-Carter Construction Company, Greenville, S. C., has the general erection contract for the mill units, for which foundations are scheduled to begin soon; concrete piles for this purpose are being driven by the Raymond Concrete Pile Company, 140 Cedar Street, New York, N. Y. Entire project will represent an investment of close to $2,000,000, with machinery. J. E. Sirrine & Co., Greenville, are consulting engineers.

Cornell, Wis.—The Cornell Wood Products Company, 230 North Michigan avenue, Chicago, Ill., manufacturer of pulp board products, folding box boards, wall board, etc., has completed plans for one-story addition to mill at Cornell, to be 60 x 120 feet, with wing extension, 20 x 20 feet. It will be used for pulp storage and distribution, and is reported to cost about $40,000, with equipment. Erection contract has been let to Hoeppner-Bartlett Company, 631 East Madison street, Eau Claire, Wis., and work on superstructure will proceed early in October.

Meadville, Pa.—The American Viscose Corporation, Delaware Trust Building, Wilmington, Del., manufacturer of viscose rayon products, has rejected bids recently received for erection of one-story addition to branch mill at Meadville, to be used for laboratory service. It is expected to ask new bids at early date. Cost reported close to $50,000, with equipment. The Balinger Company, 105 South Twelfth street, Philadelphia, Pa., is architect and engineer.

Manasha, Wis.—Central Paper Company, 622 Manitowoc street, paper goods, has approved plans for new one-story mill, 93 x 132 feet, on Manitowoc street, reported to cost over $60,000, with equipment. General contract for erection has been awarded to Fluor Brothers Construction Company, 48 Otter street, Oshkosh, Wis., and work on superstructure will be placed under way soon.

Nashville, Tenn.—The Werthan Bag Corporation, 1400 Eighth avenue North, manufacturer of paper bags and sacks, and allied products, has awarded general contract to the W. L. Hailey Company, Cotton State Building, Nashville, for erection of new boiler house at plant, recently referred to in these columns, and will begin erection soon. A new boiler unit and auxiliary equipment will be installed. Cost is reported close to $40,000, including equipment. M. R. Reese, Vendoms Building, Nashville, is consulting engineer.

Baie Comeau, Que.—The Quebec North Shore Paper Company, 680 Sherbrooke street, West, Montreal, Que., manufacturer of newsprint, does not plan expansion in mill at Baie Comeau at this time, as recently incorrectly reported in these columns.

New Companies, Etc.

New York, N. Y.—The Re-Nu Box Company, Inc., has been incorporated with capital of 200 shares of stock, no par value, to manufacture paper boxes and containers, cartons, etc. New company is represented by Maurice Danson, 1450 Broadway, New York, attorney.

Boston, Mass.—The Merrit Paper and Chemical Corporation has been chartered with capital of $25,000, to manufacture and deal in paper products of various kinds. A. B. Koffler is president; and Her-

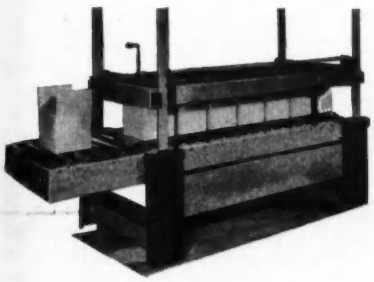
man M. Koffler, 24 Jordan road, Brookline, Mass., is treasurer and representative.

Union City, N. J.—The Peerless Roll Leaf Company, Inc., New York, N. Y., has been chartered under New York laws, with capital of 480 shares of preferred and 5000 shares of common stock, no par value, to manufacture gold and silver leaf products, foils, etc. New company will be a merger of the Peerless Roll Leaf Company, 911 New York avenue, Union City, and New Process Gold Company, New York, and will operate plant at address noted, Union City. New organization is represented by Wood, Molloy & France, 25 Broad street, New York, attorneys.

Wilmington, Del.—The Agar-Inland Kraft Corporation, care of Corporation Trust Company, Industrial Trust Building, Wilmington, has been incorporated under Delaware laws with capital of $100,000, to manufacture paper products, containers, etc. The incorporators include R. F. Lewis and L. H. Herman, address noted.

New Line of Container Sealers

Of interest to all users of corrugated shipping containers is the new line of simplified, standardized and styled container sealers, just announced by the A-B-C Manufacturing Company, 263 South 4th street, Quincy, Ill. Taking full advantage of high - speed production methods, this new entrant into the packaging field has so combined sound engineering with economy of construction and design that they can offer a full line of automatic, semi-automatic and hand sealers at prices which should prove very interesting to the trade.

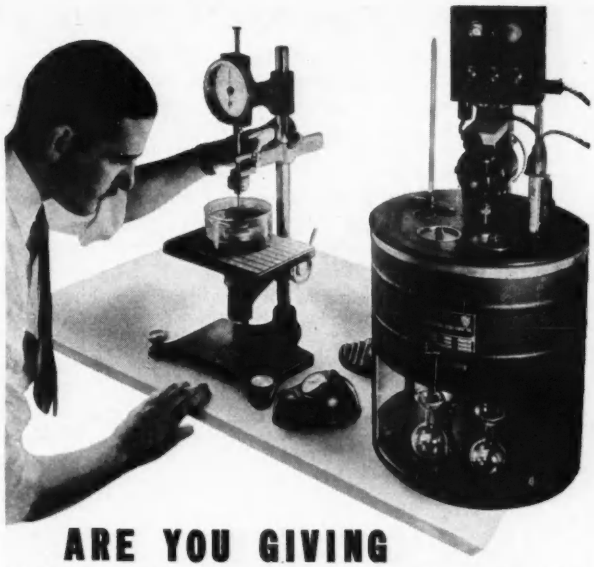


Their first offering is a hand-gluer of 26 inch capacity, at all lengths, starting with a standard 6 foot unit at less than $500. Although the manufacturers are giving emphasis to the matter of appearance and price, the equipment is covered by a 12 month guarantee.

In addition to their standardized line of sealers the company is prepared to develop many other types of special packaging equipment in order. Engineering is in charge of Morris P. Neal who is well known to the trade as an experienced and competent packaging engineer.

Buy Paper Under Walsh-Healey Act

WASHINGTON, D. C., September 25, 1940—During the week ended September 7, the Government purchased $176,881.50 worth of paper and allied products under the Walsh-Healey Act as follows: $141,676.50 worth of filter material for the War Department from Brown Company, Portland, Maine; and $35,205.00 worth of stationery for War Department from R. P. Andrews Paper Company, Washington, D. C.



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BUY DIRECT AND PROFIT DIRECTLY

History of Corrugated Containers

An interesting outline of the notable growth of paper boxes in packaging many kinds of products for safe transport, is given in "A history of the corrugated shipping container industry." The book was written by Wilbur F. Howell, secretary of the Robert Gair Company, and has just been published by the Samuel M. Langston Company, Camden, N. J.

The contents of this informative 60-page book unfolds the start and steady growth of the corrugated paper container and is compiled largely from original sources. Chapter one briefly explains the historical significance of the original patent corrugated paper, patented by A. L. Jones of New York in 1871, and a patent for packing for bottles, jars, etc., issued to O. Long in 1874.

Pioneers in the paper box industry utilizing and developing manufacturing methods from these basic patents, is given in chapter two, while in chapter three is described the development of specialties, such as the popular seal-end folding carton, later renamed the regular slotted carton, which still forms about 90 per cent of all shipping containers now in use.

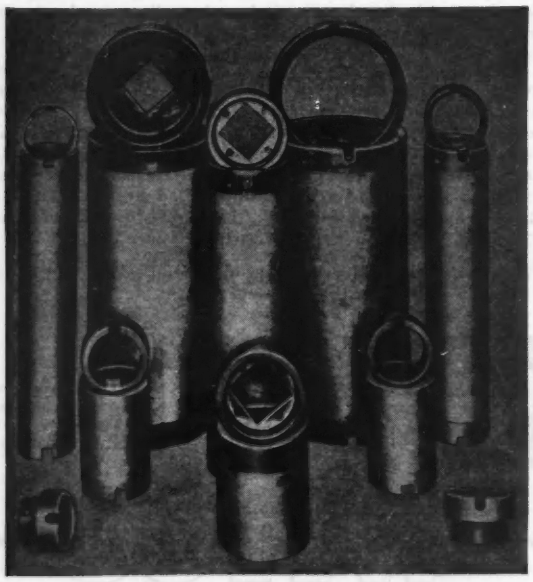
Other chapters include cooperative effort in the paper box industry and a chronological list of trade associations in the most important period in the commercial development of the corrugated paper board shipping container, from 1900-1910. Another interesting chapter describes the Pridham case of 1912, "when a Pacific Coast box maker attempted to get the east bound tariffs revised to permit his corrugated boxes to take the same rate as wood."

Other chapters briefly describe styling, testing and machine development. The final chapters trace the present and future status of the paper board container, and a postscript including the Samuel M. Langston Company, provides a clear non-technical explanation of the manufacture of corrugated containers.

Wood Pulp Cartel to Control Industry

WASHINGTON, D. C., September 25, 1940—A rigid control of all major phases of operations in the European wood pulp industry is contemplated by the wood pulp cartel, according to a report from the office of the American Commercial Attache, Stockholm.

Final details are not available but it is contemplated that there will be a rigid control of production, according to the report. Exports of each country and every mill will be on quota basis, with prices fixed by committee of representatives of each exporting country. Determination of prices to each export market for every type of pulp will be by vote. The number of votes to which each exporting country is entitled will be decided on every type of pulp for each export market by the tonnage of past exports. On the basis of exports to the United States, 1929 to 1939, inclusive, Sweden will have approximately the following percentage of votes on the types of pulp indicated: Unbleached sulphite—64.3 per cent; bleached sulphite—31 per cent; unbleached sulphate—80 per cent; and bleached sulphate—83.9 per cent. Germany and Norway and all others except Finland hold 54 per cent of the votes on bleached sulphite. Cartel headquarters will be at Berlin.



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CORINTH, N. Y.

A. D. Little Builds

Completion of a new chemical engineering building adjacent to their present research laboratories was announced this week by Arthur D. Little, Inc., research chemists and engineers, of Cambridge, Mass. Specifically designed for research in the field of chemical engineering, the new building will be used particularly for semi-plant development of projects originating in the laboratory.

The existing laboratory building, erected in 1917, will continue to house laboratory-scale and the less bulky semi-plant activities. Recently one floor of this building, previously used for routine tests and analyses, a type of work then discontinued by Arthur D. Little, Inc., was converted to use for research and development activities in biochemistry and in physics. The present additional expansion has been necessitated by continuing growth of the Little research activities, largely in association with the research departments of substantial manufacturing companies situated throughout the country.

The new building, 30 by 80 feet, and of fire-proof construction, consists principally of a large processing room the full two stories in height to permit the erection of tall equipment requiring gravity flow. A series of hatches will allow the extension of fractionating columns and similar equipment through the roof. Running the length of the building are a crane runway, mains for steam, water, gas, and electric current in three voltages, and a center drain, all designed to supply ample service to operating equipment without restricting clear passage about the floor of the building.

A large separate fire-proof storage room, provided for inflammable chemicals and for semi-plant equipment not in use, takes up the ground floor of one end bay. This provides a mezzanine deck above, which may be used either for operations requiring less head room or in conjunction with operations on the main floor. Except for explosive-proof fixtures in the storeroom, the building is lighted throughout with fluorescent fixtures of the latest type.

It is contemplated that a principal use of the building will be in connection with the development of several projects closely related to the rapidly growing interest in petroleum chemistry, and equipment now being installed is designed for this purpose.

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JORDANS

Brunswick Pulp Co. Makes Changes

[FROM OUR REGULAR CORRESPONDENT]

BRUNSWICK, Ga., September 23, 1940—A number of changes in officials at the plant of the Brunswick Pulp and Paper Company have been announced by E. J. Gayner III, general manager of the plant.

The changes were a result of the resignations of Paul Hodges, superintendent of the plant, and Lester White, assistant superintendent, both of whom have been with the plant since it started operation.

W. T. Webster has been appointed operating plant manager; Gordon K. Singletary has been named operating supervisor, and Sam T. Robinson has been appointed technical supervisor. All of these officials have been connected with the plant for some time.

PAPER
TRADE JOURNAL
Title Reg. U. S. Pat. Off.

Henry J. Berger
EDITOR

Vol. 111 September 26, 1940 No. 13

COMING EVENTS IN PAPER INDUSTRY

New England Section. Technical Association of the Pulp and Paper Industry—Third Friday of each month at the Roger Smith Hotel, Holyoke, Mass.

Delaware Valley Section. Technical Association of the Pulp and Paper Industry—Second Friday of each month at the Engineers Club, Philadelphia, Pa.

Lake States Section. Technical Association of the Pulp and Paper Industry—Second Tuesday of each month at the Conway Hotel, Appleton, Wis.

Kalamazoo Valley Section. Technical Association of the Pulp and Paper Industry—First Thursday of each month at the Park, American Hotel, Kalamazoo, Mich.

National Safety Council, Paper and Pulp Section. Annual Meeting, Stevens Hotel, Chicago, Ill. October 7-11.

TAXATION PROSPECT

The demand for substantially more revenue to finance the huge cost of the national defense program has become apparent in the long debate in the House and in the Senate on the excess-profits tax. This can only be interpreted as urgent need for higher taxes to keep the national debt within the present legal limit and prevent inflation from increasing to a degree that may prove inimical to a sound fiscal policy, without which permanent prosperity cannot be assured. On September 19 the Senate, by a vote of 46 to 22, passed and sent to conference its own excess-profits tax bill. The Senate measure was based upon the one adopted by Congress on August 29 after more or less confusion. Some eighty pages of the House bill was eliminated and some sixty pages of new matter added by the Senate. It is estimated that the bill will raise various sums up to $400,000,000 during the remainder of this year and about $1,000,000,000 annually thereafter.

The new tax bill is considered vital to the progress of the national defense program, because of the provisions allowing corporations to amortize the cost of new defense plans over a period of five years and providing suspension of the profits limitations of the Vinson-Trammell act on the construction of sea and aircraft. The most important provisions of the Senate Excess Profits Tax Bill are: (1) An increase in the tax on normal corporate income by 3.1 per cent in each bracket of existing law. (2) A tax on excess corporate profits, imposed according to a graduated schedule of rates, ranging from 25 per cent on the first $20,000 of such excess income, to 50 per cent on all above $500,000. A corporation is offered an alternate scheme and may figure its rate on the basis of a percentage of return on invested capital. (3) Excess income is defined by two schemes (1) Average earnings, whereby a corporation would be required to apply excess profits taxes to all income above the average derived in the four-year period, 1936-1939 inclusive and (2) an invested capital scheme, whereby a corporation would be taxed by the excess profits rates on all income in excess of 8 per cent of "invested capital", allowance being made of a flat exemption of $10,000 excess income from the tax under either scheme.

Invested capital is defined (4) as capital for computing excess income to "equity" capital actually invested in the business, plus 50 per cent of "borrowed" capital. (5) Special concessions for various "hardship" cases, with adjustments to be made by the Commissioner of Internal Revenue, with right of appeal by the taxpayer to the Board of Tax Appeals and the courts. (6) Permission for consolidated returns of excess profits taxes by corporations with subsidiaries and affiliates, subject to the rulings and regulations imposed by the Commissioner of Internal Revenue and the Secretary of the Treasury. (7) Suspension of the profits limitations imposed by the Vinson-Trammell act and other legislation upon builders and manufacturers of naval vessels and aircraft, involving contracts entered into or completed in any taxable year subject to the excess profits tax. (8) Permission for accelerated amortization, for purposes of tax computation, of capital invested by private corporations in new plant facilities designated by proper governmental authority as needed for national defense, providing, in substance, that such corporations may set aside tax-free earnings equal to 20 per cent of the amount of the new investment annually until plant cost is fully amortized.

In a concise and clear analysis of the Senate's tax bill Godfrey N. Nelson, lawyer, tax expert and secretary of the New York Times Company in *The New York Times* pointed out that, "if the Senate bill is enacted, the increased normal tax rates, estimated by the Treasury to yield for 1940 a revenue of $240,000,000, will be paid by corporations whether or not they become subject to the excess-profits tax. As compared with this increased normal tax revenue the excess-profits tax is expected to yield for 1940 only $115,000,000. Thus, obviously, the bill is mainly a second 1940 levy upon normal corporate income and only incidentally a tax upon corporate excess profits of 1940. In view of the extreme difficulties which certainly will be encountered in the administration of the kind of excess-profits tax under consideration . . . it seems highly advisable to defer the present tax program until a simpler and more understandable excess-profits tax bill can be formulated."

In commenting on the incomprehensibility of some parts of the bill, Mr. Nelson states in part that "It was stated on the floor of the Senate, while the bill

was there under debate, that one of the government's tax experts observed that 'the bill still penetrates more deeply into the wilderness of incomprehensibility than we have ever taken the American taxpayer before'. The bill was described as an 'imponderable mess'. The real difficulty with this legislation seems to be the absence of a plan as to the kind of profits which are sought to be tapped. There are many concepts of 'excess' profits. If the President's main purpose is to prevent the making of new millionaires from defense contracts, the profits tax should be imposed only on those industries which profit from national defense expenditures."

In suggesting that a plan of application to certain profits might lead to the adoption of a more practical formula, Mr. Nelson concludes that "the trouble with the present plan is that it represents a compromise of different methods applied to all corporate taxpayers. Taxing profits on the basis of average earnings of a standard period, in conjunction with the invested capital method, is equivalent in effect to allowing a credit on capitalized earnings in addition to a credit upon invested capital. The latter alone disregards capitalized earnings. The two methods do not form a homogeneous system of taxation. A common denominator is lacking."

Machinery Arrives for New Chilean Mill

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., September 25, 1940—Pulp-grinding and papermaking machinery purchased by Chilean interests more than a year ago has arrived in Chile and is now being installed in the new pulp and paper plant at Valdivia, according to a report from Consul Renwick S. McNiece, Valparaiso.

The corporation controlling the enterprise, known as the Compania Chileana de Celulose and Papel, is at present capitalized at 12,880,000 pesos, but it is planned to increase this total shortly to 20,000,000 pesos. Indications are that the company will be in a position to begin production toward the end of this year. An electric power plant is still on order but in the meantime electric power will be obtained from the steam-generator plant which supplies the city of Valdivia.

The paper mill will have a capacity of 3000 tons annually which will be absorbed by the Sociedad Imprenta & Lithografia "Universo," which represents the principal financial interests behind the new corporation. It is planned to increase the capacity of the paper mill and to that end it is understood that a loan of 3,000,000 pesos has been arranged with the Government Development Corporation. The machinery for the enlarged plant capacity will be obtained from sources in the United States.

General Fiber Co. Starts

The General Fiber Company, 3801 South Racine avenue, Chicago, Ill., announces that it has entered the waste paper packing business after an absence of several years.

The business was formerly conducted under the style of Gumbinsky Brothers Company.

Production Ratio Report

These statistics are based upon paper production reports to the American Paper and Pulp Association.

COMPARATIVE MONTHLY SUMMARIES[1]

Months	1940	1939	1938	1937	1936	1935	1934
January	90.2%	77.5%	63.9%	90.3%	76.1%	65.8%	.....
February	86.2%	81.7%	68.7%	90.1%	77.9%	70.0%	.....
March	83.9%	84.0%	69.6%	90.3%	76.0%	70.5%	.....
April	86.3%	82.9%	68.3%	92.1%	82.3%	70.0%	.....
May	91.7%	80.2%	69.0%	90.6%	81.6%	69.4%	.....
June	93.8%	79.7%	66.0%	87.3%	80.7%	72.3%	.....
July	87.1%	75.2%	72.0%	81.8%	77.3%	64.9%	.....
August	87.3%	82.9%	77.2%	82.9%	81.5%	70.9%	.....
September	.....	88.7%	76.3%	78.6%	80.5%	71.9%	58.2%
October	.....	96.6%	82.5%	73.5%	87.6%	75.6%	64.7%
November	.....	97.2%	79.6%	61.9%	88.0%	75.3%	61.7%
December	.....	91.1%	74.4%	54.5%	85.9%	71.2%	59.6%
Year Average	.....	84.9%	72.3%	80.6%	81.3%	70.5%	.....
First 37 weeks	87.9%	80.8%	69.6%	87.3%	79.1%	69.1%	.....

COMPARATIVE WEEKLY SUMMARIES[1]

CURRENT WEEKS, 1940		CORRESPONDING WEEKS, 1939	
August 10	90.1%	August 12	82.9%
August 17	86.6%	August 19	82.9%
August 24	86.9%	August 26	83.3%
August 31	85.7%	September 2	85.0%
Sept. 7 (Holiday Week)	71.2%	September 9	74.0%
*September 14	84.0%	September 16	91.8%

The following statistics show the number of mills reporting by ratio groups:

	Number of Mills Reporting—Current Weeks					
Ratio Limits	Aug. 10, 1940	Aug. 17, 1940	Aug. 24, 1940	Aug. 31, 1940	Sept. 7, 1940	Sept. 14, 1940
0% to 50%	46	56	54	52	79	44
51% to 100%	248	237	240	238	204	201
Total Mills Reporting	294	293	294	290	283	245

PAPERBOARD OPERATING RATIOS

Percents of operation based on "Inch-Hours" reported to the National Paperboard Association.

Year	Jan.	Feb.	Mar.	Apr.	May	June	July
1936	62%	67%	67%	70%	69%	70%	69%
1937	80%	86%	86%	88%	85%	77%	66%
1938	54%	60%	61%	57%	58%	56%	57%
1939	60%	67%	71%	69%	64%	67%	63%
1940	71%	70%	69%	70%	76%	79%	72%

Year	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1936	75%	78%	82%	80%	74%	72%
1937	74%	69%	65%	55%	45%	73%
1938	66%	66%	70%	65%	59%	61%
1939	72%	74%	84%	81%	71%	70%
1940	74%	....	....	....	....	....

Week end. Aug. 10, 1940—74%
Week end. Aug. 17, 1940—73%
Week end. Aug. 24, 1940—74%
Week end. Aug. 31, 1940—74%
Week end. Aept. 7, 1940—60%
Week end. Sept. 14, 1940—76%

[1] Production-capacity ratios are based upon six-day capacity ratings which are adjusted periodically to correspond with the ratings reported by individual companies. Ratios are subject to revision until all reports are received.
* Preliminary figure.

Canada Regains South American Market

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., September 25, 1940—Canada has regained its former paper export trade with South America which in recent years has been lost to competing Scandinavian countries, according to a report from Consul Joseph I. Touchette, Montreal. During the five-month period January-May 1940 shipments of Canadian newsprint to South American markets amounted to approximately 59,000 metric tons against 2,288 tons recorded for the corresponding period of 1939. Of the 1940 total, Argentina accounted for 40,000 tons compared with 1,600 tons in the 1939 period.

The Central American market has also turned to Canada as its source of newsprint. Canadian shipments of newsprint to Mexico from January to May of this year totaled approximately 8,000 tons as against 29 tons in the first five months of 1939.

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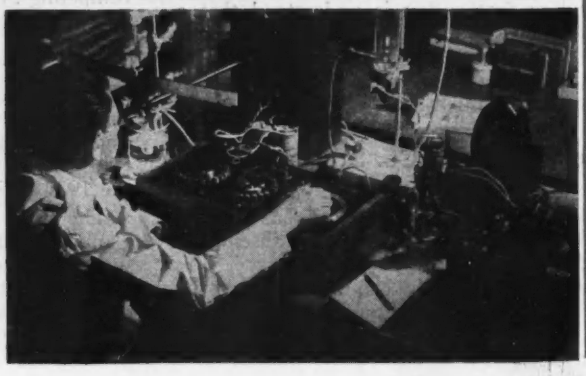

To make certain that Diamond products conform to specifications, precise tests are made at each step in manufacture. The equipment and laboratories used for some of the tests are shown in these views.

Section of the
Technical Association of the Pulp and Paper Industry

Edited by Ronald G. Macdonald, Secretary

A Symposium on Spectrophotometry in the Pulp and Paper Industries

Introduction to the Card Index System

(Continued from the issue of Sept. 12, 1940)

PAPERMAKER: When I used to work in pulp back in the good old days we didn't have any $5,000 instruments to help us out. But I'll have to admit there's been a definite improvement in pulp-color uniformity these last few years. I used to say to the superintendent: "Look, the pulp mill sends us all the colors of the rainbow, and you expect us to dye a paper to a standard!" I don't let the boys get away with an excuse like that nowadays.

METER: You probably ought to get one of the brightness testers Mr. Hatch told us about. It might even pay you to give a bonus for extra bright pulp.

PAPERMAKER: One of my competitors, a big bond manufacturer, is already doing it. He pays his bleacher men a premium to keep the brightness up. But we've managed pretty well by just comparing the pulp with a standard by eye.

METER: Well, let's get on with papermaking. How about giving me a birds-eye view of the whole process.

PAPERMAKER: A birds-eye view? It's a pleasure! The stock flows from the beater to the beater chest, and then into the machine chest—the chests are chiefly for storage—and finally it runs out onto the wire. The excess water drains through, and there's your paper, still rather wet, but otherwise OK.

METER: Now let's see; just review for me all of the materials that go into the beater.

PAPERMAKER: Materials for the beater? That's what we call beater furnish. Well, there's pulp, the dyes, the sizing, some alum to set the dyes and sizing and generally, in book papers, mineral filler. And, of course, the white water.

METER: White water? Do you mean clear water, —water white?

PAPERMAKER: No, we use fresh water only to make up the beater but once we get running we use the same water over and over so as not to throw away any pulp, filler, alum, or sizing. The pulp and filler make the water look white.

METER: The white water is what drains through the wire then.

PAPERMAKER: Exactly! Ninety-nine per cent of what flows onto the wire is water. This stock has a consistency of one per cent. The stock in the beater has a consistency of about six per cent.

METER: What is meant by consistency?

PAPERMAKER: Consistency is simply the percentage of solid matter by weight.

METER: If the beater stock has a consistency of 6 per cent, then that would mean it is 94 per cent water. That can't be right, can it? I thought it was about half and half.

PAPERMAKER: Ninety-four per cent water is correct. And the to-wire stock, as I was saying, is 99 per cent water. About 98 per cent of this water gets back to form the white water,—97 or 98 per cent depending on the freeness of the to-wire stock.

METER: "Freeness of the to-wire stock!" I suppose the "to-wire" stock is the material flowing out on the wire screen, but what is "freeness"?

PAPERMAKER: Excuse me, I should have explained. "Freeness" is the speed with which stock allows the water to drain out. A free stock will drain out fast; a slow stock will take much longer. This is done on the wire by gravity and suction, then by pressing the paper against a felt, and finally by running it over steam-heated cylinders or other drying devices. Then the paper is ready to check against the customer's color standard.

METER: You haven't told me where your customers get their standard colors.

PAPERMAKER: That's something I have been trying to figure out for years. Out of the waste basket, likely as not. Some cock-eyed customer—er, i.e., one of our valued clients—hands our salesman a little piece of paper about the size of a postage stamp. He says, "Look here young fellow! If your mill can give me a real match for that tomorrow, I'll buy 100,000 pounds!" So they call me out of bed to get the color match.

METER: Now if you had an automatic spectrophotometer, you could throw a switch, get the curve of the standard, and tell what dyes to use right away.

PAPERMAKER: Let the machine stay up nights, eh?

METER: You might need your physicist for that midnight call once in a while.

PAPERMAKER: As long as I don't have to fight the color all night; I need my sleep.

METER: I've an idea though that the spectrophotometer would save you more in the routine handling of your everyday runs than in these emergency calls. Before I could be sure of how valuable the spectrophotometer would be to you, I would have to learn more of the details of the beater furnish.

PAPERMAKER: As I told you we generally check the color of the beater furnish by eye. I would like

to see what help instruments might be, however. Have you ever heard of Mr. Griesheimer's work along this line?

METER: I understand that he is now working with coated paper.

PAPERMAKER: Yes, that's true. But he worked out an instrumental way of controlling the color of beater furnish and he dealt with many of the other problems that we have here. I asked him to come down primarily to give you an idea of what we are up against; but since having this talk with you, Mr. Meter, I believe I'd like to hear him describe his methods, myself.

METER: I'm sure he can help us both. Mr. Griesheimer is in a new field in papermaking, *physics*. The physicist first busied himself with the optical problems of papermaking only 11 years ago. R. N. Griesheimer:

Card Index and Other Methods Used in Controlling the Color of Beater Furnishes

By R. N. Griesheimer[1]

Abstract

Instrumental methods of controlling the color of beater furnishes are contrasted with the older method of visual control. Although the advantages of the instrumental methods are indisputable, neither method can be wholly successful in providing for color control of the finished sheet of paper unless account is taken of certain machine variables that affect sheet color by influencing dye retention, etc. Important variables are the pH and freeness (refining treatment)of the to-wire stock.

Instrumental methods are subdivided into empirical methods, and methods involving the absolute calculation of certain optical constants of the raw materials and finished sheet from either the Kubelka and Munk theory, or the theory of trichromatic coefficients. The latter methods are principally of academic interest and have not met wide-spread use in the industry. Two empirical methods are outlined, both depending on the ability of a technical man to associate various dyestuffs with the shapes of their spectrophotometric curves, and the displacements of these curves with changes in dye concentrations.

A particular instrumental method called the card index system is discussed in considerable detail. A program for indexing variations in reflectance at certain wavelengths (or variations in trichromatic coefficients) with weight of dye producing these changes for a given furnish is set up. It is then indicated how these data, considered with other data taken on the effect of important machine variables, can be used for predicting the color of the finished sheet. A double integrating sphere reflection meter and a time-saving wet pulp sampling procedure are briefly described as tools found useful in applying the card index system.

In conclusion, general aspects of the problem are discussed including considerations of start-up losses due to off-color, color tolerances, and the selecting of method and instruments to fit a particular mill's requirements.

Introduction

The color control of beater furnishes is essential, because it is fundamental to the color control of the finished sheet of paper; so fundamental, in fact, that it is difficult to visualize any sort of color control of the finished sheet of paper that does not rely to a large extent on careful color control in the beater room. In most cases the beater represents that step in papermaking where, for the first time, all of the materials affecting the color of the finished sheet are brought together. Here the various pulps, filling materials, and dyestuffs are combined and, it being in the interest of economy to adjust color as soon as possible, initial attempts to obtain such control seem rightfully associated with the beater furnish. The first attempts to control color in the beater room undoubtedly indicated the necessity of similar control on pulps during bleaching operations, and suggested the importance of considering machine variables, variation in color with aging of the dyed sheet and many other possibilities. Thus it is seen that control of the color of beater furnishes is both important and fundamental to the final problem of color control of the finished sheet, and therefore deserves careful consideration.

Visual vs. Instrumental Methods of Control

The oldest method of controlling the color of beater furnishes is, of course, the visual method. An experienced beater room dye man, his confidence in his judgment backed by many years of experience, can look at the dyed beater furnish, then at his color standard, and form surprisingly correct opinions as to the necessity of adding a little of this or that dye to the furnish before it is sent to the machine. Of course, he is always anxious to see a sample of the machine sheet, and often delays any suspected dye corrections until he has this sample on which to pass final judgment. Unfortunately too few mills have men of this ability or, having one such man, cannot use him 24 hr. of every day. Again, the very best dye men are often lost when asked to match a new shade, perhaps using dyes with which they have had little or no experience. As a consequence the advisability of having a reliable instrumental means of color control is indisputable providing, of course, such an instrumental procedure is simple, efficient, and accurate within established tolerance limits.

Instrumental Methods of Control May Vary

Instrumental methods of color control may vary greatly in object and complexity depending on the type of instrument available for the work. If a recording spectrophotometer is available the system of color control can be founded on the color curves

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readily obtainable with the instrument. With the abridged spectrophotometer similar curves may be plotted, but such curves are not as accurate as those of the recording spectrophotometer and demand a greater expenditure of time and trouble to get them. Regardless of the particular instrument involved any instrumental procedure is to be justified by the well-established superiority of objective to subjective evaluation of a physical quantity. Although the visual approach may on occasions be the shorter and easier, it does not necessarily follow that it will always be the better; merely because it takes less time to pass on visual judgment than it does to make and analyze instrumental determinations. Experience indicates that the dye man may have to make several efforts to adjust color by varying dye concentrations before he obtains a satisfactory visual match. Consequently the failure of the dye man to obtain the match on his first or second attempt defeats the foremost argument in favor of visual matching; i. e., the argument that, if colors can be matched quickly by an expert dye man, it is foolish to waste time and money on instruments to aid him. A good rebuttal to such an argument is the fact that the instruments necessary for objective color control can be far less expensive than the conversion loss in off-color paper that arises during the time the dye man is amassing his experience.

Any method of beater room color control, visual or instrumental, that does not consider the effect of important machine variables on color cannot assure a color match for the finished sheet. Certain dyes are quite sensitive to *p*H or to-wire freeness, for example, and in closed white water systems there is always the problem of buildup of dye concentrations and fines. Alum (to reduce *p*H) is often added to the tray water, and it is not uncommon for the dye man to add some shading dyes at the machine chest providing the agitation is good there. Because of these and other factors it is very often if not always essential to make corrections in beater dying on the basis of either a visual or instrumental examination of the sheet over the dry end.

Instrumental Methods of Beater Room Color Control

Instrumental methods of beater room color control may be considered in two classes. First there are the empirical methods, the success of which lie in the ability of a technical man to associate various dyestuffs with the shapes of their spectrophotometric curves and displacements of these curves with changes in dye concentrations. Secondly, there are the methods of absolute calculation that involve the calculation of certain optical constants of the raw materials and finished sheet from either the Kubelka and Munk theory or the theory of trichromatic coefficients. Considered only as absolute methods of calculation these two theories are of great academic interest but have not met as yet with widespread use in the industry. As tools useful in building empirical methods of color control, either or both theoretical treatments can be quite valuable, however.

The Kubelka and Munk theory makes possible the calculation of the spectral reflectivity of a dyed sheet in terms of the absorption and scattering coefficients of the pulp furnish and dyes. If spectrophotometric curves are available on sheets dyed with the individual dyes then the curve for a sheet dyed with a mixture of the dyes, in any concentrations provided the dyings are not too heavy, may be theoretically predicted with good accuracy. From this calculated spectrophotometric curve the tristimulus values of the dyed sheet may then be determined, if desired. In beater room practice the system would probably demand that a handsheet be made from the undyed beater furnish, and its spectral reflectivity be measured at several wavelengths. Then, indexed data on available dyes showing how the reflectivities at these wavelengths are decreased by various amounts of given dyes would be used to predict the necessary dye formula. The use of the Kubelka and Munk theory toward a similar end, together with its limitations, has been adequately discussed by Nolan *(1)* and is beyond the scope of this paper.

The theory of trichromatic coefficients enables one to locate a point on a chromaticity diagram which represents the color in question, at least so far as its dominant wavelength and excitation purity are concerned. On the same diagram are plotted curves, each one of which represents a given dye applied to the chosen furnish at various concentrations. If the point representing the color in question lies between the loci of the specifications of any two dye curves it can be matched with respect to dominant wavelength and excitation purity by a suitable mixture of the two dyes. It then remains to be seen whether the desired visual efficiency can be matched by a combination of the two dyes. The visual efficiency of the combination is best determined by interpolation between relatively close, empirically determined values of the visual efficiency of other sheets dyed with various combinations of the two dyes under consideration. A discussion of the use of trichromatic coefficients in color matching was given by Foote *(2)*. The method is not one that would be used as routine procedure because of the time it demands, even when a mechanical integrator is available for computing the tristimulus values, but as will be indicated later serves as an excellent foundation on which to build a card index system for beater room color control.

At present, empirical methods of instrumental beater room color control are the most promising from the practical point of view. Two such methods will be discussed to illustrate the possibilities of the empirical approach, but it should be remembered that both of these are subject to modifications and revisions; the specific color problems with which a particular mill is faced will in the end determine the method that will work most efficiently for that mill.

Empirical Method Used by Munising

The most common empirical method (as used successfully by the Munising Paper Co.) is simply the adjustment of beater dying as indicated by a spectrophotometric examination of (a) a handsheet made from the dye beater furnish and (b) periodic machine samples that are taken at short intervals at the startup and less frequently as the run continues. When starting a new order a sample of colored stock is taken from the beater before it is dropped, made into a small handsheet, and checked for color on the spectrophotometer. This provides an opportunty for adjustment, if necessary, before the stock is sent to the machine chest. As soon as the stock gets to the dry end of the paper machine a beaterman gets a sample and checks it on the spectrophotometer against

the standard reflectances set up for the order. Usually 4 wavelengths are adequate for this work, data often being taken at 458, 480, 556, and 660 mmu. If necessary, "doctoring" begins, and spectrophotometric checks follow until the standard is matched within the established tolerance limits. If the color is a new one and difficult to match it may be desirable to compare trichromatic coefficients and visual efficiency between the standard and sample sheets, such data often representing the color difference more intelligibly than reflectivity data taken at several arbitrarily chosen wavelengths. In due time the beaterman obtains the experience necessary to adjust his dye formula so as to "pull the reflectances at the 4 wavelengths into line." He learns, e.g., about how much an extra ounce of blue or red dye affects each of the 4 reflectances and uses this information in adjusting his dye formula.

Card Index System of Color Control

Another empirical, instrumental means of beater room color control is the so-called "card index" system, or planned method for the equilibrium of the run. It differs from the above method, in that it tends to shift some of the responsibility for color matching from the beater room dye man to the technically trained man—a desirable shift in cases where the dye man, although perhaps quite experienced in visual color matching, does not have the technical training necessary to undertake an analysis of spectrophotometric data. The card index system is based on the assumption that all of the important variables affecting the color of the final sheet of paper may be separately considered in the laboratory, and after a large amount of laboratory handsheet dying and calculation based on either the Kubelka and Munk theory or the theory of trichromatic coefficients, compensations in dye formulas can be offered to take care of any reasonable variation in any one of the factors. Finally the dye formula is successively corrected for variations in each of the individual factors. After the system is set up the dye man looks to the cards for the dye formula he should use in matching a given color. He has a minimum of data to take and calculation to make, most of the work having already been done in setting up the index file.

Whereas the first method discussed demands that the dye man form his own conclusions, having taken the necessary spectrophotometric data, the card index system figuratively takes his data and then tells him the dye formula to use. In the end the system does not add a technical man to the mill payroll, but merely demands a year or two of his time, as a development man, for setting up the program. This being the case the card index system should be especially attractive to the larger corporations that own several mills, all of which have the same or similar color problems once the system is put into operation at one mill and proved there it can be transferred bodily to any other mill with little additional expenditure. After the index file has been completed there is little or no need for an expensive spectrophotometer to keep it going; simple auxiliary apparatus will then suffice for most color matching problems.

The Card Index System in Operation

Fortunately the card index system is sufficiently flexible so that it can be set up to handle almost any kind of beater room color problem. Since it would be impossible in a paper of this sort to attempt a broad discussion of its applications to a number of color problems the writer will deal specifically with the evolution of a card index system applicable to a particular grade of dyed papers (No. 4 sulphite bond) in his own mill.

We shall select the color *salmon,* it being particularly interesting; because it is perhaps as difficult a color to match as any that is made in this mill. The first card indexed under Salmon Moistrite Bond will give the color specifications of the standard sample of salmon. The dominant wavelength, visual efficiency, and excitation purity are given for both the handsheet made from the undyed furnish and the machine-made sheet. Previously determined tolerances are given for the machinesheet, and the file number of the spectrophotometer curve of the color is given. Finally the dye formula is presented, 3 dyes being involved for salmon, and data are given for the standard operating *p*H and to-wire freeness. This first card simply says, then, that if the furnish is standard in color and if the *p*H and to-wire freeness are quite close to standard, the dye formula given should come quite close to matching the standard salmon color.

The most common furnish variation is a substitution of a certain percentage of broke for sulphite and soda, and so the second card in the index is concerned with the modifications necessary in the standard dye formula when white, cherry, or pink bond broke is used in the furnish. These are the 3 broke colors, not including salmon, that can be used in the salmon beater furnish. The dye formulas cited for these 3 broke colors are based on 100 per cent broke furnish, but since broke is never used 100 per cent in the beater furnish it is necessary to use simple laws of proportion to calculate the dye formula that will be used with 10 per cent pink broke, for example. In this case 10 per cent of the dye amounts recommended for a 100 per cent pink broke furnish will be added to 90 per cent of the dye amounts specified for the standard soda-sulphite furnish. It is to be understood, of course, that the technical man has spent many hours dyeing broke and determining the I.C.I. specifications on the dyed broke handsheets before these dye formulas for the various broke colors are available for indexing.

Only high brightness, rather expensive filler materials are used in Salmon Bond, and then only in relatively small amounts. With such grades of filler material, used in such small and constant amounts, brightness and color changes are usually too small to cause any trouble. Consequently no card need be devoted to fillers in this particular case. Should it be necessary to change the percentage filler, however, it must be remembered that larger filler amounts result in higher daylight reflectance and lower saturation purity, and a card would be necessary to handle the case. In book grades, where filler percentages are rather high, a card on fillers would definitely be essential.

The next card in the file is concerned with the dye changes made necessary by color variations in the pulps involved. At this point the card index system is specialized so as to deal as simply, yet as effectively as possible with our specific pulp problems. Neither the bleached sulphite that we bleach in our own bleach plant nor that which we purchase suffers enough color or brightness variation to demand compensation

on anything but white bond. Careful color control in pulp bleach plants pays dividends in this case. Soda pulp is much more of a problem, however. Incomplete bleaching necessitated by an overtaxed bleach plant, wide variations in the woods used for soda pulping, hard water, and other factors all tend to give a soda pulp that darkens or "yellows" quite easily. This yellowing is the key to the dye compensations made for off-color soda.

At this point it is necessary to very briefly describe the tools developed for routine testing of soda pulps. In Fig. 1 is pictured a simple apparatus used to press "wet" soda pulp disks. The disk cup is filled with soda pulp as it is supplied to the beater room at about 3 per cent consistency. The cap is mounted in the cup, and gentle hand pressure is applied to squeeze out excess water. Then, by means of the simple lever, cam, and weight arrangement, further pressure is applied to the pad for 2 min., 4 thicknesses of blotter serving to soak up the water forced out under this applied pressure. Final moisture content is about 45 per cent, so that the wet disks will give lower brightness readings than dry ones. These disks are read at once (wire side) on the auxiliary reflection meter (Fig. 2). Experience has shown that at this final moisture content the disk brightness is fortunately not too sensitive to small variations in moisture such as are to be expected in the interval between formation of disk and its brightness reading.

The double integrating sphere reflection meter has 4 barrier layer photocells in each sphere, the 4 cells in either sphere being uniformly spaced around the vertical great circle of the sphere, and connected in series. The galvanometer reads the difference between the photocurrents from the 2 spheres. Calibration, at a given sector opening in the "standard" sphere, and using a white enameled plate as the reflectance standard is accomplished by varying the position of the source between the 2 spheres. After calibration the brightness of the pulp disk is read from a counter

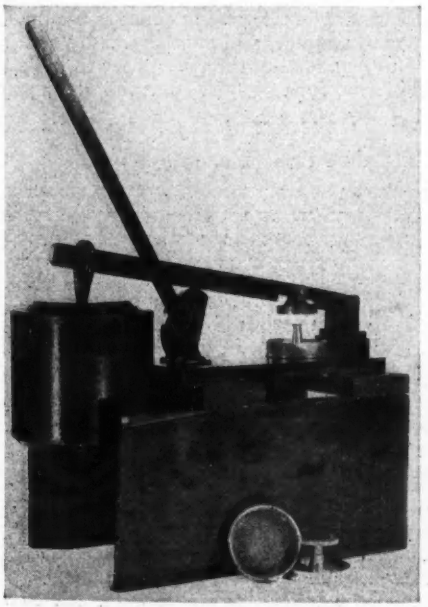

FIG. 1.
Apparatus for Making Pulp Disks

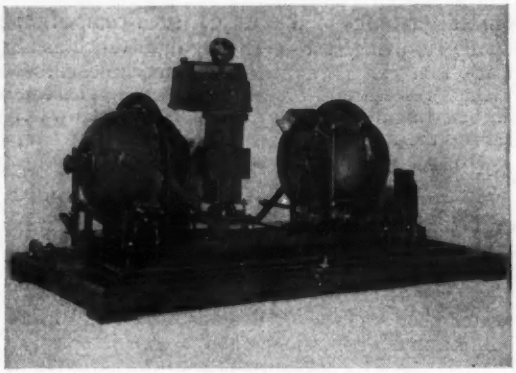

FIG. 2.
Auxiliary Reflection Meter

which is mechanically tied in with the sector opening on the standard sphere. The reflection meter is used as a null instrument, the sector opening being varied until the galvanometer reads zero, or the photocell currents from the 2 spheres are equivalent. In the present instrument filters must be manually changed, if the instrument is to be used as an abridged spectrophotometer. The usual precautions of good voltage control for the lamp and good MgO coatings of the sphere interiors are observed. The instrument is periodically calibrated against a recording spectrophotometer.

To return to the discussion of the yellowing of soda pulp, an empirical expression for this yellowness has been set up. The ratio of the wet disk reflectances at 570 and 450 mmu, less unity, is called the "yellowness figure," and a standard yellowness figure has been set up for soda pulp. Dye corrections are then determined which apply when the soda pulp is +4, +2, —2, and —4 points yellow, respectively. If too high a degree of accuracy is not required a simple brightness measurement at 450 mmu may be used in place of the yellowness figure for indicating the necessary dry changes. This possibility is advanced, because it has been found that if the brightness is plotted against the yellowness figure (all data taken on wet disks) a large majority of the points from 50 soda samples will fall acceptably close to a best straight line through the points. On our pulps the dye formula correction based on brightness data falls within ± 3 per cent of that based on yellowness data.

The fourth card is concerned with variations in dye formulation occasioned by a substitution of pulps, e.g., sulphate for sulphite. It is well known that various pulps have different affinities for the same dye, i.e., adsorption of a given dye will not be the same on an unbleached pulp as on a bleached, etc. *(3)*. Thus the technical man, when setting up this card index system, must foresee the various substitutions that may be made in pulp furnish, from time to time, and collect the fundamental data necessary to enable him to set up new dye formulas for the furnish variations.

At this stage of the procedure adequate color control of the beater furnish has been reasonably assured, but before the job is completed it is necessary to consider machine variables such as *p*H, to-wire freeness, and possibly headbox consistency. Not only does the retention of certain dyes vary with *p*H, but in addition many dyes suffer color changes with varying *p*H; i.e., they are indicators, in effect. Thus a card is necessary to indicate the dye changes necessary to com-

pensate for off-color due to *p*H, such compensations usually involving fast developing dyes (such as auramine) that can be added at the machine chest for quickest results, and for relief until the *p*H situation can be straightened out by addition of fresh water or alum to the tray water.

To-Wire Freeness

To-wire freeness seems to be the most difficult problem to handle with the card index or any other system. If the stock is slowed down in order to get proper strength character in the sheet, the extra refining tends to increase dye retention. The slower stock presents greater fiber surface for dye adsorption and in addition, inasmuch as drainage at the wire is usually decreased, the extra water in the sheet as it enters the drier section carries additional dye in solution with it. *Direct* dyes are affected the most by freeness changes, *acid* dyes are next, and *basic* dyes are affected the least. Exact corrections for freeness variations are difficult, because the variation in retention that follows is a function of the type of freeness drop (hydration, fibrillation, cutting, etc.) that has occurred. A freeness drop due to jordan cutting should increase retention less than a similar freeness drop associated principally with fibrillation or hydration. In the latter case more adsorbing area will be created than in the former. The strengths of the pulps involved in any particular furnish apparently have a great effect on the magnitude of the dye correction, probably because a weak pulp responds differently to a given refining treatment than does a strong pulp. As a consequence of the above, the card concerned with to-wire freeness variations may at times be useful (better than nothing) but cannot be trusted too far.

It might be mentioned at this point that other machine variables such as machine speed, hydration of the fibers in the finished sheet, and the calendering pressures to which the sheet is subjected all have some affect on color. An increase in machine speed results in freeness and drainage variations; an increase in hydration or calendering pressures affects colors by decreasing the number of air-cellulose interfaces at which reflection can take place, thereby increasing the number of transitions through dyed fibers, with resulting increased absorption and deeper color *(4)*. These particular variables are more subject to control than some others; however, it has been the writer's experience that they need not be considered in the card index file, if the machine tender is careful of his speed and pressures.

At times the beater room dye man will feel inclined to radically change the standard dye furnish, perhaps because he wishes to experiment with a new dye, or perhaps because he tires of the steady inroad the *science* of the card index system makes on his *art* of papermaking. Whatever the case, however, a new dye furnish will be tried, and a new card subsequently appears in the file to indicate the success of the trial. On this card will be given the tristimulus values on the final "match," and it can be shown whether they rest within the tolerance limits. A criticism of the dye furnish will be offered, and its usefulness compared with that of the standard furnish.

In concluding this discussion of the card index system it is important to note again that its success depends upon a vast amount of laboratory work, based on either the theory of trichromatic coefficients or the Kubelka and Munk theory, that a technical man has accomplished before the system is put into operation. The beauty of the method is that, once it is set up, it can be used by a nontechnical man, and simply used without the necessity of making and interpreting frequent spectrophotometric curves. The fewer the variables that must be considered on separate cards, the greater the chances are that the system will meet with practical success, and the easier will be the system to operate. The card index system may fail on some color-matching jobs, but should work very well on those for which it has been carefully chosen and adequately carried out.

General Aspects of the Problem

One of the most important considerations in beater room color control concerns the reduction of startup losses due to off-color. Depending on the capacity of the white water system and the machine speed, the color of the sheet gradually deepens, while the concentrations of dye and fines are being built up to normal. If the time required to reach equilibrium conditions is appreciable, it is necessary to dye the first beater or two heavy and occasionally add dye at the machine chest. Also the *p*H of the fresh water in the tray must be adjusted, either by addition of alum directly to the tray water or by lowering the *p*H of the beater stock to a point where, when it meets the fresh water of the white water system, it will rise to the desired operating range. Every dye man in every mill using closed white water systems must appreciate these facts.

Startup losses are especially important in short runs, where they represent an appreciable percentage of the total tonnage. Consequently it seems essential to reserve one card in the card index file for startup adjustments. Such a card would specify the low *p*H for the first beater or two, it having been previously determined what this *p*H must be so that, when the stock meets the high *p*H of the fresh water, a satisfactory *p*H will result. Further, the same card would specify the percentage increase in the various dyes, for the first, second, and possibly third beaters, necessary to give the correct color while the white water dye and fine concentrations are building up to normal. In those cases where running changes are made from one color to another, still another card would specify the dye to be added to the tray water to kill an undesirable yellow, for example, from the previous color.

Relative Simplicity of the Card Index Method

By this time the reader may have the impression that so many cards are necessary in the card index system that it has become hopelessly complicated. Such is not necessarily the case. Very seldom is it essential to consider every card under Salmon Bond, for example, when making that color. Freeness and *p*H tests may show that there is no need to compensate for them at the time being, and the soda pulp may remain fairly constant in yellowness for a day at a time. Usually the problem is hardest to handle on Monday morning startups, but once a long run of a given color has been gotten under way, checks on the variables and corrections for them proceed quite smoothly. Quite often 3 cards (startup, broke, and soda pulp "yellowness") are sufficient for a run.

Tolerances are of prime importance, of course, and in operation the card index system considers the relation between tolerances and the corresponding range of operating variables. Thus it may be shown the to-wire freeness on a run of salmon can vary anyplace between 100-150 cc. (Green tester), with the subsequent variation in color being within the ac-

cepted tolerance limits. Freeness corrections will not be attempted on this color until the freeness departs from these limits. Tolerances may change from time to time, of course, being small in bad times when competition is keen and large in boom periods when almost any kind of paper is acceptable on the market.

In conclusion, a few comments will be made concerning the selection of the method and instruments to fit a particular mill's requirements. First of all, a survey of the annual loss due to off-color and color variations and an estimated savings over a 10-yr. period will suggest the amount of money that can be safely invested in beater room color control. If this amount is small the simplest of abridged spectrophotometers will probably represent the best investment. Such an instrument should be adqeuate for putting into practice the first empirical, instrumental method discussed herein; i.e., adequate, but of course not as convenient as a recording spectrophotometer. If the problem is considerably more involved and larger sums of money may be saved, then it would be desirable to purchase a recording spectrophotometer and present a capable technical man, probably a physicist, with the problem of setting up a card index system of one sort or another, later building or purchasing necessary auxiliary control equipment. If most of the mill's production is white paper more attention will have to be given pulp and filler brightness and color than if deeply dyed colors were the majority. Regardless of the instruments available and method chosen, that method will have to be adapted to the individual problem of the individual mill. Even should the card index system be chosen, the variables that may be of prime importance in one mill may be secondary in another, and the method should be tailor-made to best serve its function.

Acknowledgment

The author wishes to acknowledge the efforts of L. C. Lewis, R. E. Stevens, and Kenneth Langley in furthering the development of the card index system, the system herein described being original with Dr. Lewis. He is especially indebted to Dr. Lewis for suggestions and criticisms helpful in the composition of this paper, and to F. E. Greenwood for the description of the method of beater room color control at the Munising Paper Co. factory.

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(To be continued)

Pulp Bleach Plant Design Factors

By Roderick O'Donoghue[1]

Abstract

This article indicates some of the engineering and chemical research problems involved in the selection of a bleaching process for a specific application and gives some data on equipment which may be used in its construction.

Bleaching is fundamentally a continuation of the cooking process in which the ligneous and coloring matter remaining in the cellulose is removed with as little degradation to the fibers as possible. With this in view, the cooking action should be controlled to produce a uniform and easily bleached pulp. Therefore, consideration of a bleaching process should commence in the pulp mill with the idea of not only improving the quality of the pulp, but also attempting to standardize this so that quality will be uniform. Along these lines the first step is to produce clean uniformly sized chips and wood of as uniform and low moisture content as is practical, allowances being made in the cooking for unavoidable variations.

The pulp mill investigation would include a study of the advantages gained by indirect cooking and forced circulation, the strength and characteristics of the cooking liquor, details of the variable factors during the cooking operation, and the time cycle. It would also include pulp washing and screening problems, the latter operation being of considerable importance in bleaching.

Pulp Tests

Assuming that a proper pulp has been obtained, tests should then be made to determine the manner in which it should be bleached. These are performed in the laboratory to determine the brightness, color, cleanliness, and physical characteristics obtained by single stage and various combinations of multistage bleaching and should predict the actual operating results of the system selected.

Multistage Bleaching

Bleaching was started as a single-stage operation, but the development of hard bleaching pulps, particularly sulphate, made it essential to use more than one step to develop the strength and color desired. The advantage of multistage bleaching has also been shown in connection with more easily bleached pulps. The steps most commonly used are: chlorination, caustic extraction, and hypochlorite bleaching. A further step might be included in connection with the practice of giving a final acid treatment to brighten the pulp and fix the color. Hypochlorite bleach liquor is an oxidizing agent which attacks the cellulose as well as the lignins, but chlorine under normal usage will not appreciably act on the cellulose. It loosens up and combines with the ligneous matter. By treating the pulp first with chlorine, the chemical requirements are reduced, and at the same time a stronger and brighter pulp is obtained.

However, chlorine does not penetrate the fibers sufficiently and release all the ligneous and coloring matter, because chlorides are formed which resist further action. It is for this reason that alkali or caustic has been introduced as an additional step as it dissolves the chlorides attached to the fibers and permits penetration into the fiber, thereby releasing more of the impurities. An almost pure alpha-cellulose can be obtained with caustic and it is also used to increase the bulk and opacity of the pulp.

Hypochlorite is used as the final bleaching agent. The major steps which have just been outlined may be varied in number and arrangement depending on the bleachability of the pulp. For instance, the stages may consist of chlorination, caustic extraction, and hypochlorite bleaching, or may extend to as many as six stages composed of chlorination and caustic

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extraction followed by two more stages of the same and then two stages of hypochlorite bleaching. Often a compromise must be made between what may appear to be an ideal arrangement of steps, as indicated by laboratory tests because of the operating costs for such a system. This will also apply to the practicability of making a system flexible so as to be capable of producing various qualities and grades of bleached pulp.

Batch *vs.* Continuous Bleaching

The various bleaching steps having been determined, the next question is whether a continuous or batch treatment, or a combination of both is to be used. In general a continuous system has a cheaper initial cost, and takes less space, and should take less power. The reason is that in the batch system the reaction cells are necessarily idle part of the time, and larger pumps, piping, etc., must be installed in order to fill up the cells with the least possible loss of time. Also the pulp washing equipment must be larger as it usually cannot be expected to operate 100% of the time.

A continuous system has the disadvantage that it is not practical, where numerous changes are made in the types and characteristics of pulps being bleached. It is also more difficult to control the final characteristics of the pulp, unless the pulp and the various bleaching operations are uniform. For this reason the final stage is frequently a batch one in what is otherwise a continuous system.

In general, mills making a single type of pulp for their own consumption or mills making pulp for outside consumption can use a continuous system to advantage.

With this system it is usually desirable to have a large storage of pulp ahead of the bleaching process capable of holding several digesters' capacity to obtain a blend as uniform as possible. However, a hard and soft cook may be mixed with the result that some of the fibers would be overbleached, but with proper pulp mill control, this problem would be minimized.

The batch system lends itself to a quickly changing demand for various pulps and bleaching characteristics, as may be the case in a mill making numerous grades of paper. A large pulp storage ahead of the bleaching system is not required, but a sufficient amount must be provided to round out the operations in the reaction cells without unnecessary delays. Chests must be provided for at least two separate grades of pulp and their capacities determined by working out a time-cycle chart of operations. In a batch system the reaction cells for the various stages should have the same tonnage capacity, and in some cases it may be desirable to have this the same as that of the digesters.

Continuous Bleaching Equipment

The primary object in all bleach equipment is to see that the chemicals are thoroughly mixed with the pulp, and that this condition continues during the reaction period. With this in mind, various and ingenious arrangements have been devised, some including equipment for all the stages. A common factor is that the reaction chambers are designed for a continuous flow of stock through them and of sufficient size for the desired reaction time. Where the tonnage is large one cell may be too big for this problem, in which case the flow is divided in a number of cells operating in series or in parallel. The latter arrangement is perhaps more suitable, where future increase in capacity must be considered.

Chlorinators

It is usual for the pulp to be supplied at a uniform volume and consistency, the latter varying from 2.5 to 5%. At the same time the chlorine must be introduced in such a manner, that it is completely absorbed in the liquid and evenly distributed among the pulp fibers. The amount of chlorine must be controlled and its effects readily checked.

The most generally used type of chlorinator is a cylindrical tank, in which the stock and chlorine are thoroughly mixed as the stock enters it or immediately beforehand. It is usual to introduce the pulp and the chlorine at the bottom in order to minimize the escape of chlorine gas; and the top discharge makes it practical to go directly to a vacuum filter, where soluble chlorides are removed.

In some cases particularly on hard bleaching pulps, a large percentage of the total chlorine is introduced and after about 5 minutes, lime is added to neutralize the acid formed by the reaction and to produce hypochlorite bleach liquor from the remaining free chlorine. Sufficient additional reaction time varying from three-quarters to 1½ hours may be added in order to carry on this second reaction. The pulp is finally discharged in an alkaline condition and can be washed on filters of iron construction, whereas rubber covered filters are commonly used for acid chlorination. The lime is introduced in liquid form and mixing equipment is provided for hydrated or quick lime. Sufficient storage of milk of lime for 24-hour requirements is desired.

Into this primary stage 40 to 80% of the total chlorine demand of the pulp may be introduced depending on pulp and process used.

Continuous chlorination is a simple operation, but must be laid out so that all factors are under control, and so the pulp can be frequently and simply tested to see that this is true.

Temperature is important from the standpoint of retention of high percentages of chlorine in the solution and the effect on the cellulose. When the temperature is 80 deg. F. or lower, results are usually satisfactory, and there is little effect on the fiber. Where it is over 100 deg. F., a marked degradation of fiber may occur. With an increase of temperature from 50 to 100 deg. F., the hydrochloric and hypochlorous acids are said to increase threefold: if the temperature is too low, the tendency is to increase the time of reaction. It is desirable to have chlorination carried on at a pH of about 2.

Pulp may be chlorinated at high consistency, 40 to 50%, in which case a special technique is required.

Caustic Extraction

This is usually carried on in vertical towers and frequently at low consistency of between 4 to 7% which permits easy agitation and uniform distribution of the chemical. However, higher consistencies, from 8 to 16% are more desirable from the standpoint of steam and caustic economy. In this case the alkali must be thoroughly mixed with the pulp before entering the reaction cell and actual agitation during the reaction stage kept at a minimum, both from the standpoint of power and the hydrating effect on the stock. The amount of caustic varies with the type of pulp. For easy bleaching sulphite, this may be 0.5

to 1%. On hard bleaching pulps such as sulphate, it may vary from 1.5 to 3%. The amount may be more where it is desired to obtain a high alpha content, in which case reaction may take place at temperatures of 200 deg. F. or more. For ordinary pulps, it is increased to 110 to 125 deg. F.; and the reaction time, after the temperature has been raised, is about one hour.

A number of alkalis have been tried in place of caustic soda including lime, but their effectiveness is much less.

It is important that the pulp be well washed after this reaction.

Hypochlorite Bleaching

This may be carried out in one or two stages depending upon conditions, but in any case the percentage of the total chlorine used should be small, particularly in the final stage, and some active chlorine remain in the pulp at the end. During the reaction it is desired to maintain the pH of the stock above 8. Where it is allowed to fall in the range of 6 to 7 rapid degradation of the fibers will take place. The alkalinity may be maintained by introducing milk of lime or caustic, preferably the latter and this should be added when the reaction is about half completed depending on the rate at which the pH of the pulp is reduced. For low consistency bleaching, the temperature should be a maximum of 40 deg. C. and at 15% consistency, 25 deg. C.

Batch Bleaching

This differs from a continuous system in that the stock contained in the reaction cell is given its chemical charge and then kept moving or recirculating during the period of reaction.

The first step in design of such a system is to decide on the number and capacity of the reaction chambers for each stage based on the time cycle of operations in each, including the intermediate washing and storage (if any) operations between stages.

Chlorinators

These are usually limited to about 6 tons capacity with stock between 3 and 5% consistency. Control equipment is desired so that stock will be of uniform consistency and the pulp tested for chlorine demand.

The units are usually vertical cylinders in which the chlorine is introduced in the bottom, where it is thoroughly mixed by means of an agitator which also gives circulation. Frequently an inner tube is used to make this more thorough. The units are high to reduce the tendency for unabsorbed gas to escape. Nevertheless, fans or ejectors are provided to vent any such gases outdoors. It is usual to have a waist high peephole with hinged glass cover and suitable lighting, so that the operator can watch operations in the chlorinator. In a batch system it is desirable to introduce the chlorine as fast as it can be absorbed, because it saves time. Various methods of accomplishing this are in use with the result that chlorine can be fed from 12 to 30 pounds per minute, the chlorine being introduced in the gaseous state. Where the chlorinator height is low, the gaseous chlorine is sometimes absorbed in water before being introduced to the chlorinator. One method in common use is to mix the gas and water by means of an ejector. By this method it is possible to introduce a finely dispersed mixture of chlorine gas and water containing 50 grams of chlorine per liter, whereas the ordinary solubility of chlorine gas in water is 4.6 grams per liter at 104 deg. F. This fine dispersion of the chlorine gas permits a higher rate of addition owing to the larger reactive area exposed by the chlorine.

Caustic Extractors

These are usually constructed of vertical cylinders arranged for agitation and means of heating the stock. It is common to operate at 3.5 to 8% consistency using pumps or internal propellers for agitation. However, it is more economical to have a consistency of about 16% in which case the Fletcher-type cell may be used. With high consistency the caustic should be thoroughly mixed with the stock before entering the reactor. The caustic should be diluted between 3 and 7%. Where caustic extraction is carried on in two stages, it is possible to use the waste liquor from the second in the first unit in order to save heat and chemicals. Causticizers may be equipped with vents and peepholes, the latter having Pyrex glass covers because of the temperature. With high density reactors, the stock is dumped into a chest and diluted ahead of the washer. This soaking period is an advantage in obtaining good washing.

Hypochlorite Bleaching

There are many designs for batch operation with consistencies varying from 4 to 16% or higher. If there are two hypochlorite stages, it may be found desirable to have the first carried on at high density, but in any case it is usually desirable for the final stage to be low consistency, because the amount of bleach liquor added at this point makes it otherwise difficult to get good distribution. This is particularly the case when it is found necessary to add more liquor before bleaching is completed in order to attain the desired brightness.

Acid Treatment

Pulp as discharged from the bleachers should be in an alkaline condition and have some remaining active chlorine in it. Acid is often used at this point or after washing in order to bring out a flash bleaching action from the remaining chlorine and to put the pulp in an acid state. The result is that one to three points improvement in brightness may be obtained and also a more permanent color.

There is an additional advantage, where the stock is supplied directly to the beaters, inasmuch as less alum is required. Some of the chemicals used in this stage are sulphur dioxide, hydrochloric, and sulphuric acids. Assuming sulphuric acid is used, this may be bought in tank car lots at 66 deg. Be., from which it can be unloaded into a steel storage tank. The pulp is washed after the hypochlorite stage and diluted to 2 to 3%, when the acid at full strength may be added and thoroughly mixed. Enough is used to reduce the pH of the stock to about 4.5 which may amount to 10 pounds per ton of pulp. It then passes through a tower with a retention period of 10 to 15 minutes and is then given a final wash.

Rescreening

For high quality pulps the stock should be rescreened and in some cases riffled. This is done as a final operation; but in order to save an additional dilution and thickening, it can be carried on before the bleach washer; in which case some foam may be produced. This is not severe in a multistage system, where the amount of bleach added in the final stage is small. It is desirable that flat screens be used and

the advantage of chrome-nickel steel plates considered to reduce the number of screens required.

Washing

Washing is one of the important operations in connection with bleaching. The problem after each stage is to remove as near 100% as possible of the soluble impurities of the bleaching reactions. Some of the soluble materials are in the water solution surrounding the fibers and some in the fiber cells themselves. If the pulp is washed directly after bleaching, the impurities adsorbed to the fiber surfaces are barely affected. For best results, liquor should be drained off the pulp after the reaction, diluted with water, and allowed to soak for a period to allow the solubles in the fibers to diffuse. The pulp is then in good condition for the final wash. For best results, soak the pulp at a dilution of about 1% and agitate to save time on the soaking period. Such a procedure is used in production of high quality pulps but is often considered too involved and too expensive for ordinary conditions.

Where the pulp is to be washed directly on a filter, preferably of the vacuum type, it is important that the feed should be uniform in volume and consistency with the latter not over 1%. A good vacuum is desired and only fresh wash water, distributed uniformly over the entire washing space. The amount of water used should be about 15 pounds per pound of pulp and preferably hot. A cylinder about 8 feet in diameter has advantages, and the area should be large enough so that the cylinder will revolve at a slow rate.

Use of hot water for washing pulp may be objected to on the grounds of cost. Often this objection may be overcome by using waste heat such as that from digester blows.

If the water supply is good in character and plentiful, the pulp should be diluted and washed after each stage with fresh water. If this is not the case, the washer effluent may be re-used, counterflow to the process. Water shortage is also overcome by use of white water from the paper mill. If the latter contains too much alum, it must be handled with care, inasmuch as it may tend to set the color of the pulp before the bleaching is completed. The temperature of water used in the chlorination stage should not be over 80 deg. F. The amount of water used will depend on the number of stages and pulp consistencies. This may vary between 30,000 and 150,000 gallons per ton. The amount of fresh water used will depend upon the amount of white water introduced. Some figures on the amount of fresh water used in bleaching are summarized from TAPPI Special Report 298 *(1)* entitled "Survey of Paper Mill Water Requirements".

These are as follows:

WATER REQUIRED PER TON OF PULP

	Max. gal. per ton	Min. gal. per ton	Ave. gal. per ton
Fresh water used for bleaching sulphite, without connected paper mill	92,000	50,000	75,720
With paper mill connected	41,600	39,000	40,200
Bleaching soda pulp with paper mill connected	40,000	12,700	26,000
Sulphate pulp	67,000	5,000	36,000

The amount of fresh water used may be influenced by the quality of the water available. This in turn would have an important effect on the quality of bleached pulp obtained.

Tentative specifications for water developed by TAPPI *(1)* is as follows:

IMPURITIES IN PROCESS WATER

	Proposed standard p.p.m.	Permissible tolerance for low grade products p.p.m.
Turbidity	5	25
Color	5	15
Residual chlorine	0.3	0.8
Total dissolved solids	75	150
Mineral solids	80	200
Hardness	Up to 100	200
Potassium permanganate	10	20
Iron as Fe	0.05 to 0.1	0.2
Manganese as Mn	0.05	0.1
Hydrogen ion concentration (pH)	7	6.7 to 7.3

Presence of iron in water is undesirable as it is readily absorbed by pulp fibers, discoloring the pulp.

The hardness of water is classified as follows in parts per million *(1)*:

HARDNESS OF WATER

1-60 p.p.m.	Soft
61-120	Medium Hard
121-180	Hard
180-plus	Very hard

There is a distinct disadvantage to washing pulp with hard water. Insoluble calcium and magnesium resinates are formed on the fibers making subsequent bleaching more difficult.

Handling and Preparing of Bleaching Chemicals

Chlorine

This usually comes in tank cars which should be located as near the bleach plant as possible, on dead-end sidings, provided with safety switches, and to take care of two tanks, one of which may be left undisturbed while the other is being moved. It is desirable to have two tanks connected to the bleach plant in order to avoid interruptions, and the piping should be laid out carefully for emergency control. The equipment and the arrangement of it to safely handle this material is well-known. Chlorine is supplied directly from the tank cars, usually by pressure developed in same, and is augmented by means of separate air supply to provide pressures up to 150 pounds. The air used must be thoroughly dehydrated in order to prevent the development of corrosion, and anhydrous calcium chloride is usually used for this purpose. Means are taken to meter or weigh the amount of chlorine used for the chlorination and in the manufacture of the bleach liquor.

Hypochlorite Bleach

Lime is slaked, settled and stored, time being allowed for the milk of lime to cool. In some cases, milk of lime is made from hydrated lime, particularly where it is desired to keep the bleach making operation as simple as possible, but in this case the cost of materials is higher.

A simple method of making hypochlorite bleaching liquor is to put a definite quantity of lime slurry of fixed density in a tank with circulating pump attached. The liquid chlorine is fed into the milk of lime until the desired strength of the bleach liquor is reached. The chlorine is fed into the circulating pump circuit and circulation is kept up until the proper amount of chlorine has been used. The batch is then allowed to settle, and the clear liquor is decanted off for use in the bleach plant. The sludge is washed and then discarded, or in some cases is reburned to produce calcium oxide. At least 24-hour storage of bleach liquor should be provided. A smaller service tank is usual in the bleach plant from which a measured quantity is fed to the bleachers. Where cost is against the use of caustic, to control the pH of the stock in the bleachers, milk of lime

can be used, pumping this from the bleachmaking plant to the service tank over the bleachers.

CAUSTIC

This comes in tank cars of 50 deg. Be. strength. These hold 8,000 to 10,000 gallons, and are provided with steam coils, inasmuch as this strength freezes at about 50 deg. F. The caustic is unloaded by compressed air or pump into storage tanks, preferably of 12,000 to 14,000 gallons capacity. The pipe lines and the storage tanks are also heated, where there is danger of freezing. The strong liquor is pumped to diluting and mixing tanks, because it is usual to use the caustic at a strength of about 4 to 7%. A typical arrangement for supplying continuous causticizing and batch causticizing is shown in Fig. 1.

The amount of caustic soda (sodium hydroxide) used and its strength depends on the pulps being treated. Assuming 2%, then an 8,000-gallon tank car containing 50,000 pounds of caustic would last about 12 days for a 100-ton pulp mill. The white liquor in a soda mill may be used instead of purchased caustic.

Materials of Construction

There is a wide divergence in materials used in contact with the stock during the various stages. Frequently the selection of materials is made from the standpoint of those best able to resist corrosion and to produce the highest quality pulp and in other cases to reduce the first cost of the installation. There are those who feel the art of bleaching will change in a few years time and hesitate to invest large sums in expensive equipment.

The chlorinators and the equipment connected with their operation are subjected to hydrochloric acid which is formed in the reaction. Therefore, the tanks are made of steel with rubber or tile linings or of concrete with tile linings. However, there are numerous instances where wood is used, knowing that these may not last more than 8 to 10 years. A comparison is made of a batch chlorinator 15 feet diameter by 22 feet high with inner draft tube 10 feet diameter and equipped with a vertical propeller at the bottom direct connected to a 40-hp. motor setting on top of the unit. The comparative costs are as follows:

TANK COST

	Estimated cost	Relative cost %
Steel tank, tile lining, inner tube steel, rubber covered	$12,500	100
Concrete tank, tile lining, inner tube steel, rubber covered	8,500	68
Concrete tank, tile lining, inner tube and top of wood	6,000	48
Wood tank with inner tube of wood	4,500	36

The piping is steel, rubber or wood lined, or stainless steel, 18% chrome, 8% nickel, 3 to 5% molybdenum.

Pumps are rubber lined or of stainless steel.

Agitators are iron, rubber covered, with stainless steel propellers.

The caustic extractors may be of steel and cast iron which applies also to piping, pumps, and agitators. In some cases the tanks are tile lined.

The hypochlorite bleachers can be made of concrete and may be tile lined. In many cases iron is kept out of contact with the stock, in which case auxiliary equipment is made of bronze, copper, rubber, stainless steel, and wood.

Steel tanks are used for storage of the concentrated sulphuric acid and the piping is steel with ammonia valves and fittings. The pump may be of cast iron body with Durimet glands and Hasteloy check valves with Durimet seats. Where the acid is diluted, rubber and lead are used. To handle the pulp to which the acid has been added, steel pipe lined with Lithcote has been found satisfactory as well as wood-lined pipe.

To handle caustic, steel tanks and piping are satisfactory, while pumps may be cast iron, fitted with Monel shafts.

For chlorine the piping is extra heavy steel with 3,000-pound drop-forged steel fittings. Litharge and glycerine are used to make threaded joints tight. The pipe coil connections between the chlorine tank cars and piping, and between the piping and the drum on scales is usually copper. Where chlorine is in contact with moisture, piping should be rubber, lead, or glass.

For hypochlorite bleach liquor the tanks may be of concrete or tile; and the piping and pump, of cast iron.

Stock Chests and Agitation

Where storage is used as a means of quickly filling a reaction cell such as chlorinator, it is not always essential to provide agitation. An economical and easily cleaned construction is a vertical tank with a 30-degree cone bottom provided with large outlets to the pump for easy drainage. Rectangular tanks are sometimes more desirable and good agitation may be obtained by using a midfeather and propeller agitators.

This brings up one of the most important elements in a bleach plant. The most common forms of agitation are by means of propellers, impellers, paddles, and screws. A proper selection depends upon the type of chest, amount of agitation required and the consistencies being handled. The amount of agitation required is an important factor to decide on in con-

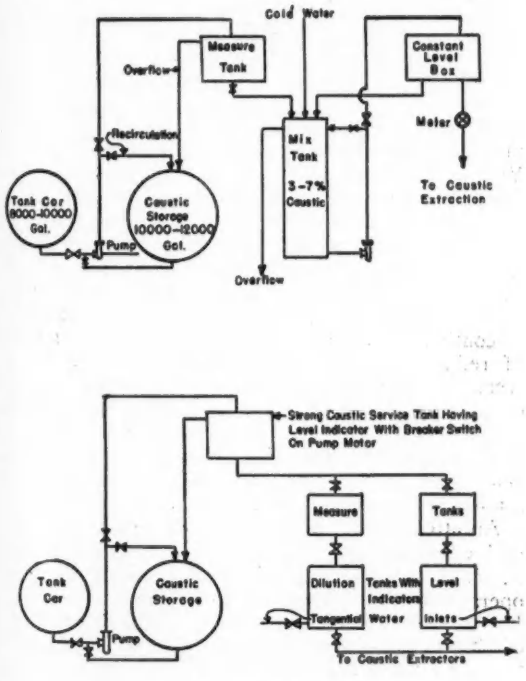


FIG. 1

Upper: Continuous Caustic Supply System. Lower: Batch Caustic Supply System.

nection with its relation to the amount of power consumed and the effect on the stock itself.

Conveying and Control

Pulp from washers to reaction tanks is usually handled on rubber belts or screw conveyors. The latter are sometimes selected in order to thoroughly mix the chemicals with the pulp. They may be constructed of corrosion-resistant metals or rubber-covered steel. The selection of the rubber is of importance from the standpoint of satisfactory, long-time performance.

A modern bleach plant may be operated with little labor if properly laid out and provided with suitable control equipment. The control equipment of considerable importance are: (1) consistency regulators; (2) stock volume control; (3) meters for steam and chemicals; (4) liquid level gages; (5) temperature recorders; (6) remote control of motors; (7) remote control of valves; and (8) pulp testing equipment, conveniently arranged.

Consistency control is important—e.g., in a 5-ton chlorinator designed for 4.5% consistency, an increase to 5% means 1,000 pounds more stock. If 5% chlorine is to be added in this stage, there would be a shortage of 50 pounds, which amounts to 10%.

Chart of Operations

Figure 2 shows a flow diagram of a 3-stage system and the time cycle chart for same is shown in Fig. 3. This is scheduled for a production of 80 tons of pulp, stages are chlorination, caustic extraction, and hypochlorite. Sixty tons of pulp are to be made and the balance is purchased sulphite and sulphate which is to be bleached. The own-make pulps are poplar and a coniferous wood, cooked by the soda process; the amount of each varies from time to time, depending upon the paper mill requirements. The pulp is cooked in 3 ¾-ton digesters. A study of demand of pulp

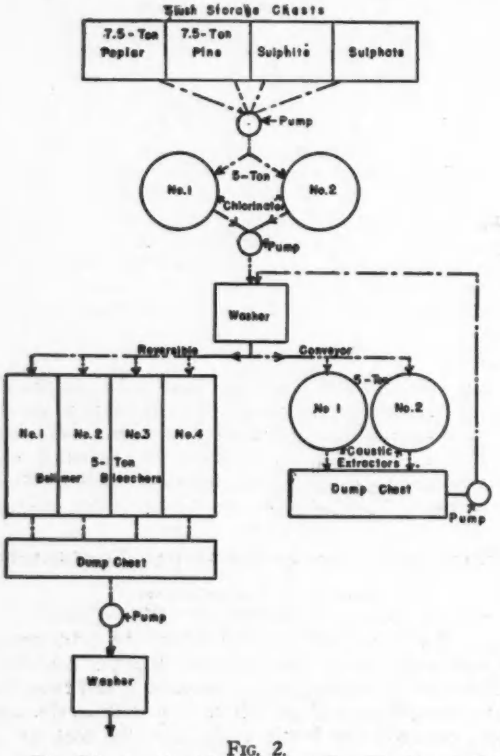


FIG. 2.
Flow Diagram of a Three-Stage, 80-Ton Bleaching System.

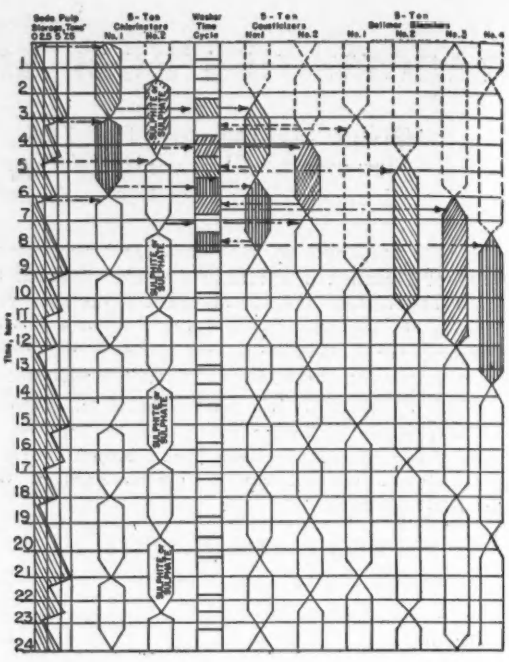


FIG. 3
Time Chart of Bleaching Operations.

from the various sources indicated that storage tanks of 7½-tons capacity were required. The equipment consisted of two 5-ton chlorinators designed for 4.5% consistency stock without dump chests; two 5-ton caustic extractors for 16% consistency with a common dump chest; four 5-ton hypochlorite bleachers for 6% consistency with a common 5-ton dump chest. For this equipment two vacuum filters were provided, one for washing the chlorinated- and caustic-treated pulps and the other for the bleached pulps. The chart shows the chlorinators operating on a 3-hour cycle, ¼-hour for filling and ¾-hour to pump out over the washer. Caustic extraction is the same cycle with ¾-hour filling from the washing operation just mentioned and ¾-hour emptying time. When the pulp is washed over the same filter as in this case, it can be seen how the performance centers around the operation of the washer. The pulp goes from the latter operation by screw conveyor to one of the bellmer bleachers, where the cycle is six hours, ¾ hour being for filling and one-half hour for dumping. The operations for the bleacher dump chest can be continuous which is important from the standpoint of reduced water storage capacity and size of the second washer. The white water in this stage is used over again on the other washer. It also permits continuous operation if acid treatment is used, in which case the stock is diluted to about 2% density as the acid is added. The pulp is pumped continuously to a retention tower and from there to the final wash.

An attempt has been made to cover the more general considerations in designing a bleach plant. By carefully working out the details, a plant can start operations, and give good results in a short time. However, it is essential to have a thorough knowledge of bleaching and the actual operation of bleach plants to assure these results.

Literature Cited

(1) TAPPI Special Report 298. "Survey of paper mill water requirements". New York, Technical Association of the Pulp and Paper Industry (Dec. 14, 1939). 54 pp.

Imports of Paper and Paper Making Stock

Giving Manifests of New York, Boston, Philadelphia and Other Ports of Newsprint, Wrapping, Writing, Coated, Blotting, Tissue, Strawboard, Bleached Sulphite More Acute—Some Grades of Old Waste Lower.

Effective September 30, 1939, under Treasury Decision 49,970, all publications, exchanges and trade associations, were denied access to import manifests at the New York Customs House. The Paper Trade Journal and other interested parties have vigorously protested this ruling, and as soon as the order of the Treasury Department is modified or rescinded, full publication of all manifests will be resumed in these columns. In the interim, the Paper Trade Journal is making every possible effort to gather all available information from manifests, at various outside sources.

NEW YORK IMPORTS

WEEK ENDING SEPTEMBER 21, 1940

SUMMARY

Wall paper .....1 cs.
Newsprint .....14,183 rolls
Stencil Paper.....6 cs.
Miscellaneous paper.....14 cs.

WALL PAPER

——, ——, Yokohama, 1 cs.

NEWSPRINT

H. G. Craig Co., Inc., ——, Donnacona, 341 rolls.
International Paper Co. ——, Gatineau, 242 rolls.
H. G. Craig Co., Inc., ——, Donnacona, 336 rolls.
——, ——, Liverpool, N.S., 5,707 rolls.
H. G. Craig Co., Inc., ——, Donnacona, 372 rolls.
——, ——, Comeau Bay, 7,223 rolls.
H. G. Craig Co., Inc., ——, Donnacona, 321 rolls.
International Paper Co., ——, Gatineau, 291 rolls.

STENCIL PAPER

American Indicator Paper Co., ——, Kobe, 6 cs.

MISCELLANEOUS PAPER

H. Reeve Angel & Co., Inc., ——, Yokohama, 12 cs.
S. H. Pomerance, ——, Lisbon, 2 cs.

RAGS, BAGGINGS, ETC.

Union Bank of Australia, ——, Sydney, 11 bls. old rags.
Castle & Overton, Inc., *Argentina,* Montevideo, 20 bls. rags, 5 bls. hosiery, 4 bls. worsted clippings.
——, *Argentina,* Buenos Aires, 52 bls. rags.
Williamson Products Co., *Argentina,* Rio de Janiero, 134 bls. cotton waste.
Atlas Waste Manfg. Co., *Oriente,* Havana, 16 bls. cotton sweepings.

CASEIN

American British Chemical Supplies, *Argentina,* Montevideo, 1,951 bags.
American British Chemical Supplies, *Argentina,* Buenos Aires, 417 bags.

PHILADELPHIA IMPORTS

WEEK ENDING SEPTEMBER 21, 1940

Manufacturers Trust Co., ——, Buenos Aires, 70 bls. glue stock.

Westminster Advertises M. D. Napkins

[FROM OUR REGULAR CORRESPONDENT]

VANCOUVER, B. C., September 23, 1940—Westminster Paper Mills have now divided their advertising account and placed the campaign for their M.D. sanitary napkins in the hands of Stewart McIntosh Ltd., Vancouver, advertising agents. A new six-page folder has been released to the trade by the agency outlining the new campaign which is of the direct merchandising type. The folder offers to the trade full window display material, suggestions for store display, five quarter page newspaper advertisements and a number of two and three colour displays and dealer advertising inserts. This combination newspaper advertising and store display offer is being featured in a deal presented to the trade as a special introductory offer.

Westminster Paper Mills launched their M. D. product approximately two years ago in British Columbia and have now extended their merchandising to cover all Western Canada. The new sanitary napkin is similar to that which was first produced by the company's American subsidiary at Bellingham almost three years ago and which enjoys a wide sale in the Western States.

German Mills Operate at Capacity

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., September 25, 1940—Germany's paper and pulp industry operated at full capacity during 1939 and raw material supplies were adequate according to annual reports just issued by the twelve largest mills, according to a report from Consul J. C. Hudson, Berlin. This situation, it is pointed out, was made possible because of a shift of the industry from spruce to other kinds of wood for pulp manufacture, largely through its replacement by beech and by an expansion of sulphate pulp production from fir. Production figures for 1939 are not shown. However, it is reported that structural changes in the paper and pulp industry have been manifold and far-reaching and that sales have substantially increased.

The twelve mills reporting have an aggregate invested capital of approximately 180,000,000 Reichsmarks (approximately $72,000,000). Their net profits in 1939 are stated to have totaled 10,110,000 Reichsmarks ($4,000,000) which compares with 8,800,000 Reichsmarks ($3,500,000) in the preceding year.

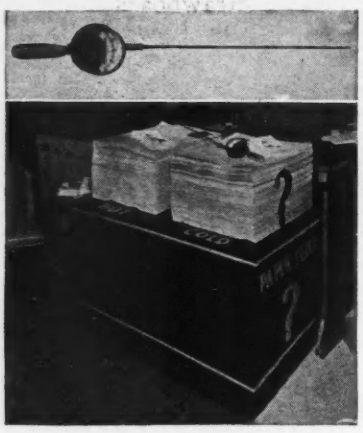
Eliminate Charge for Paper Containers

[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., September 23, 1940—Under a ruling of the State Milk Control Board the extra charge of one cent a quart for milk sold in paper containers will be eliminated beginning January 1, and from that date housewives will be able to buy milk at the same price charged for bottle milk, less the cost of the bottle.

New Paper-Temp

Among the interesting new developments for the paper and allied industries is the new Paper-Temp, a simple, practical instrument developed by Perfecting Service Corporation, Chicago, to help the printer eliminate losses from paper spoilage due to temperature differences between the paper and the press room.



Considerable interest in this new instrument has been created it is stated, due to the fact that printers heretofore have had no practical means of determining the temperature of a load of paper before removing the wrapper and knowing whether the paper and room temperature are in balance.

According to the manufacturer, the Paper-Temp definitely puts an end to the cause of most paper spoilage by enabling the printer to check the temperature of the paper and unwrapping only when it is at the same temperature as the press room. Complete details about this new instrument can be secured by writing to Perfecting Service Corporation, 2622 South Parkway, Chicago.

"Business Organization"

Because of the increasing volume of business and the resulting need for building up or supplementing the existing personnel, questions of organization are in the forefront of business thinking today. Key executives faced with problems of organization whether company-wide or departmental, may find data of practical assistance in a new report entitled, "Business Organization" just issued by the Policyholders Service Bureau of the Metropolitan Life Insurance Company.

This report provides information on certain general principles and general patterns of organization structure which can be applied to individual circumstances. A major part of the report is devoted to a description of the organization plans of 20 representative companies as case studies under the broad industrial classifications of railroads, public utilities, manufacturers and retail establishments.

Among the points discussed are basic types of organization, the subdivision of authority into administrative groups, the factor of span of control and the question of centralization or decentralization. It also considers the committee, both as a policymaking and as an administrative device, and the place of organization charts and manuals in the general picture.

This report is available to executives who address the Bureau on their business stationery. Address: Policyholders Service Bureau, Metropolitan Life Insurance Company, One Madison avenue, New York City.

Installs New Salt Spray Chamber

The United States Testing Company has just completed installation of a salt spray chamber at its main laboratories in Hoboken, New Jersey to test the corrosion resisting properties of ferrous and nonferrous metals.

The chamber has been designed to test materials against A.S.T.M. and Federal Specifications. The apparatus contains a thermostatically controlled heating element for conducting the tests at elevated temperatures. The compressed air supplied to the nozzle is previously saturated with the standard salt solution and thoroughly cleaned to insure freedom from oil and dirt. The complete unit is automatically controlled.

The construction of the chamber is such that a finely divided mist or fog is obtained and no condensation from the top falls on the specimens. The size of the chamber is extra large so that all sizes of samples can be tested from small test specimens to full size commercial products. Nails, zippers, radiator grills and instrument casings are a few of the products now undergoing tests in the new salt spray chamber.

Great Britain Mill Directory

The 78th annual edition of "The Paper Mills Directory of Great Britain and Ireland" has just been published by Printing Craft, Ltd., 18 Featherstone Buildings, Holborn, W.C.I., London, England. The price is 3 shillings, postpaid.

The directory contains four sections, part one covering paper manufacturers in Great Britain and Ireland, board mills, paper coaters, etc. Part two lists home and foreign agents and gives London addresses of paper merchants and wholesale stationers. Allied and associated trades are represented by lists of paper makers, engineers, manufacturers of paper making materials and waste paper dealers.

The section devoted to general trade information includes lists of associations, paper trade publications, export data, watermarks and brands, tables of weights and other useful trade information. A new section includes kraft and wrapping paper manufacturers and agents.

Electronic Devices for Industry

Since electrical engineers first put vacuum tubes "in over-alls" a few years back, the industrial application of devices utilizing these tubes has grown so unobstrusively (and steadily) that it is quite surprising today to discover the number of such devices available and the extent of their use throughout industry.

A new 20-page booklet entitled: "Electronic Devices for Industry" (GES-2411), just published by General Electric, briefly lists some of the more important vacuum-tube apparatus and describes its application and method of operation. An idea of the scope of the little pocket-size publication can be gathered from the fact that it deals with such a variety of devices as photo-tubes, d-c motor control, the recording spectrophotometer, exposure meters, pyrometers, gas-discharge and high-vacuum electronic tubes, the Reactrol system, automatic arc-welding equipment, ignitron rectifiers, resistance welding, and battery-charging equipment. Copies are available on request.

Ti-Machine Doctor Blades

Over one hundred mills in all parts of the country come to us regularly for their Doctor Blades. The list is growing steadily because both blades and service are good.

The bulk of the orders are for Ti-Machine steel blades but a substantial proportion specify stainless steel, bronze and plastic material.

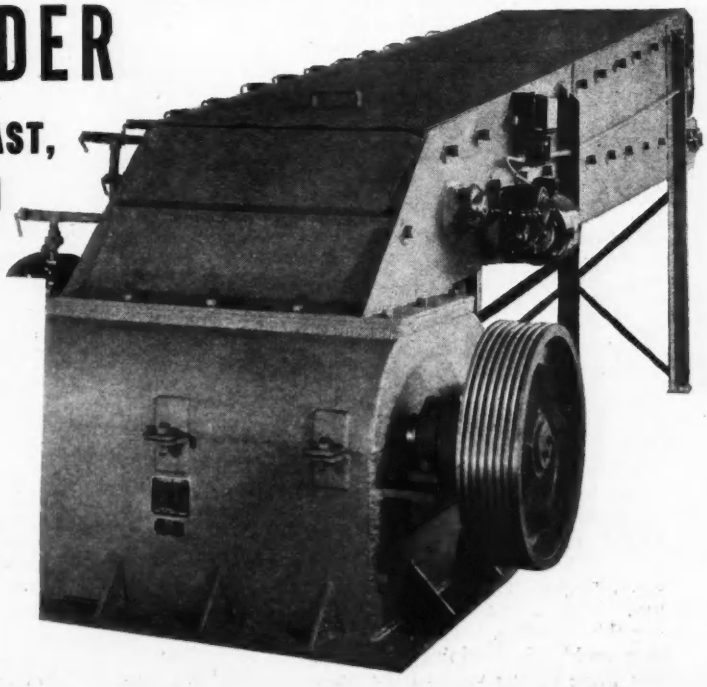
Special equipment is used and trained men turn out the blades. Machining is not a difficult operation, but straightening steel blades in such a manner that they will be relieved of strains and stresses is a manual operation amounting to an art.

If you are not already receiving your Doctor Blades from us, will you not send us your next inquiry and try them out?

Montague Machine Company

Turners Falls, Mass.

BAUER SHREDDER



● **BREAKS UP LAP STOCK FAST, THOROUGHLY AND ON LOWER POWER INPUT**

Why install expensive pulping machinery to break up lap stock when you can obtain like results with a Bauer Shredder?

1. Does not shorten fibers
2. Reduces beating time
3. Reduces maintenance cost on beaters
4. Capacity as much as 48 tons per day
5. Power input as low as ½ HP. days per ton

Investigate . . . . At Once

THE BAUER BROTHERS CO.

SPRINGFIELD, OHIO

New York Paper and Pulp Market Review

Pulp Market Weak With Lower Prices On Some Grades of Kraft Now Quoted At $55 Per Ton—Paper Market Less Than Seasonally Active — Rags Quiet — Paper Stock Market Stronger In Tone.

Office of the PAPER TRADE JOURNAL,
Wednesday, September 25, 1940.

Demand continues to lag below wholesale trade expectations, according to reports received from many manufacturers, representatives, jobbers, and general paper merchants during the current week. Current retail trade, however, in many lines, including department store sales, is substantially above last year. The index of the Department of Commerce, based on the 1929-1931 average, reached 146 in August, compared with 131.1 for the like month last year. The Federal Reserve Board reported department store sales in this district for the week ended September 14 was 10 per cent higher than the corresponding week last year.

Manufacturers' inventories of paper and allied products for July, according to the Department of Commerce, stood at 194.6 per cent, computed on the January, 1939 base, compared with 194 in June and 92.6 in July, 1939. The index of value of paper shipments was 134.6 in July, compared with 142.1 in June and with 191.7 in July, 1939. The rise of almost 13 per cent in unfilled orders during July, was the largest increase in a single month this year, and increased total backlog orders to a higher figure than at the peak last year. During July, 1940, manufacturers' shipments in both durable and non-durable goods declined 6.50 per cent.

Wholesale sales volume during the current week is reported moderately good in some lines, with reports indicating demand in some lines is below that of the comparative period last year. In view of the high price of wood pulp, current market quotations on many grades of paper and paper board are viewed in some quarters of the industry as definitely out of line.

Paper prices hold fairly firm at this date, with the prospect that a substantial increase in demand is likely to occur weeks later this year than was experienced last year.

Mechanical Pulp

Prices hold unchanged on domestic and Canadian mechanical pulp. No important change in the market situation has been reported during the current week.

Chemical Pulp

The chemical pulp market continues to reflect the weakness that prevailed last week. The higher grades of bleached and unbleached sulphite are firm, but the ample supply of kraft pulp has resulted in an easy situation in this grade. Current prices on kraft pulp, f.o.b. pulp mill are quoted at from $55 to $75 per ton. The price advance in unbleached sulphite during this year has been about 80 per cent, and 35 per cent on bleached sulphite, while the advance from the low price of the year to the highest quoted on contract, has been about 80 per cent on kraft pulp.

Rags

Mill buying of rags continues limited and in rather small volume for the season. The market is fairly steady with the higher grades firm. No important change in prices or demand has been reported during the current week.

Old Rope and Bagging

The old rope market is strong at this date, under steady mill buying of old Manila rope. Lower grades of rope, and strings are quiet.

Prices on old bagging are firm, with buyers continuing to show caution in entering the market. Prices hold unchanged.

Old Waste Paper

The paper stock market continues to reflect a strong tone under active buying of board and felt mills. No important changes in any grade of old waste paper has been reported this week.

Twine

The twine market is reported as a little more active this week. Trading is below trade expectation, with prices holding fairly firm on most grades of hard and soft fiber twines.

Sap-Peeling Operations at Peak

WASHINGTON, D. C., September 25, 1940—Seasonal activity in the Fort William and Port Arthur District is well advanced, according to a report from the American Consulate, Toronto. Sap-peeling operations are at a peak with over 10,000 men employed for the June-September period. Wages are 10 per cent above those of a year ago. As a result of the curtailment of Baltic woodpulp imports into the United States the biggest cut of sap-peeled pulpwood ever made in the district is in progress along the north shore of Lake Superior. It is expected that 275,000 to 300,000 cords will be cut and shipped to the United States this summer, compared with 220,000 cords in 1939. The seven paper mills in northwestern Ontario operated at 96.8 per cent during May and 58.97 per cent in June, 1939.

A Unique Idea in Blotters

A unique idea in consistent blotter advertising is being used this season by the Gilbert Paper Company, of Menasha, Wis.

Blotters are editorial in type and contain a variety of interesting copy to stimulate reading. Issued monthly, one of the outstanding features of the copy is a brainteaser. This is intended to encourage holding of each current month's blotter until the Gilbert salesman calls with its successor containing the correct answer to the poser.

Other copy features include a calendar, two human interest quotations, a story of the month (as a smile-getter), a letterhead design and a merchant selling message. Space for imprinting the merchant's own name is provided on each blotter.

LOOKING FOR BETTER *Smoothness?*

IF your customers demand a cleaner printing surface that makes the type stand out crisp and clear on your boxboard, liner and other papers, here's an invitation to test out the PQ Silicate of Soda method.

The percentage of silicate to add to the beater depends on the furnish and the effects you want. But one thing certain is that mills using PQ Silicate obtain paper or board with an even finish, minus "pick" and "fuzz".

Give your papers the quality, suave look by laying low those stubborn short fibres with PQ Silicate. May we cooperate with you?

SILICATES OF SODA

PHILADELPHIA QUARTZ CO.

General Offices & Laboratory: 125 S. Third St., Phila., Pa.
Chicago Sales Office: 205 W. Wacker Drive. Stocks in 60 cities.
Sold in Canada by NATIONAL SILICATES LTD., Toronto, Ont.

THEY DON'T INTRIGUE US A *little* BIT!

IN OUR middle thirties now, we have made our choice and are well content. The paper field has always been our first and only love. Lindsay is entirely satisfied to produce Fourdrinier and other types of wires for your market only. We are kept fully occupied with our endeavor to make wire cloth just a little better year after year. This, to the end that your product may in turn be progressively finer and your cost of manufacturing it progressively lower.

THE LINDSAY WIRE WEAVING COMPANY

Serving the Paper Field Since 1903

14025 Aspinwall Avenue • Cleveland, Ohio

MISCELLANEOUS MARKETS

Office of the PAPER TRADE JOURNAL,
Wednesday, September 25, 1940.

BLANC FIXE—Quotations on blanc fixe are firm and continue unchanged at prevailing market levels. Demand reported moderate for the week. The pulp is currently quoted at $35 per ton, in barrels, at works; the powder is offered at $50 per ton, f.o.b., works.

BLEACHING POWDER—Prices on bleaching powder are firm with demand continuing moderate for the week. Bleaching powder is currently quoted at $2 per 100 pounds, in drums, at works.

CASEIN—Quotations on casein are reported a little lower for this week. Standard domestic casein, 20-30 mesh, is currently quoted at from 11½ to 13 cents per pound; 80-100 mesh, at from 12 to 14 cents per pound; all prices in bags, car lots. Standard Argentina casein is currently offered at from 11½ to 12½ cents per pound. No quotations on French casein.

CAUSTIC SODA—Prices on caustic soda are firm and unchanged. Shipments continue in moderate volume. Solid caustic soda is currently quoted at $2.30 per 100 pounds; flake and ground at $2.70 per 100 pounds, in drums, at works.

CHINA CLAY—Quotations on china clay are firm and continue unchanged this week. Domestic filler clay is currently quoted at from $7.50 to $15 per ton; coating clay at from $12 to $22 per ton, at mines. Imported clay is quoted at from $13 to $25 per long ton, ship side.

CHLORINE—The demand for chlorine is reported good. Prices are firm and continue unchanged for the current week. Chlorine is currently quoted at $1.75 per 100 pounds, in single-unit tank cars, f.o.b., works.

ROSIN—The rosin market is reported as firm with prices lower for the week, "G" gum rosin is currently quoted at from $1.50 to $1.54 per 100 pounds, in barrels, Savannah. "FF" wood rosin is currently quoted at from $1.50 to $1.54 per 100 pounds, in barrels, New York.

SALT CAKE—Prices on salt cake are firm under a steady demand with current quotations continuing nominal. Domestic salt cake is currently quoted at $17 per ton in bulk; chrome salt cake at $16 per ton. All prices in car lots, f.o.b., shipping point. The quotation of $20 per ton on imported salt cake continues nominal.

SODA ASH—Quotations on soda ash are firm and continue to conform to prevailing market quotations. Shipments reported in steady volume. Quotations on soda ash in car lots, per 100 pounds, are as follows: in bulk, $.90; in paper bags, $1.05; and in barrels, $1.35.

STARCH—Prices on corn starch are reported firm and continue unchanged at prevailing market quotations. Pearl is currently quoted at $2.95 per 100 pounds; powdered starch at $3.05 per 100 pounds; all prices in bags, car lots, f.o.b., Chicago.

SULPHATE OF ALUMINA—Quotations on sulphate of alumina are firm. Demand reported good for the week. The commercial grades are currently quoted at $1.15 per 100 pounds; iron free at $1.60 per 100 pounds, in bags, car lots, f.o.b., works.

SULPHUR—Prices on sulphur are firm and continue to conform to prevailing market quotations. Annual contracts are currently quoted at $16 per long ton, f.o.b., mines. Spot and nearby car lots are quoted at $19 per ton.

TALC—Quotations on talc are firm and continue unchanged at prevailing market prices. Domestic talc is currently quoted at from $15 to $21 per ton, at mills. Quotations on imported talc are nominal.

MARKET QUOTATIONS

Paper

(Delivered New York)

News, per ton—			
Roll, contract	$50.00	@	—
Sheets	58.00	"	—
Kraft—per cwt.—Delivered Zone A			
Northern, Extra Quality	$5.25	@	$5.75
Superstandard	4.87½	"	5.25
Northern Standard Wrapping	4.37½	"	4.62½
Standard Wrapping	4.25	"	—
Tissues—Per Ream—Carlots			
White No. 1	.97½	"	—
White No. 1 M. G.	.95	"	—
White No. 1½	.80	"	—
White No. 2	.75	"	—
Anti-Tarnish M. G.	.80	"	—
Colored	.85	"	—
Kraft	.87½	"	—
Manila	.77½	"	—
Unbl. Toilet, 1 M.	3.75	"	—
Bleached Toilet	5.26	"	—
Paper Towels, Per Case—			
Unbleached, Jr.	2.10	"	—
Bleached, Jr.	3.60	"	—
Manila—per cwt.—C. l. l. a.			
No. 1 Jute	8.25	@	10.25
No. 1 Manila Wrapping, 35 lb.	5.25	"	—
No. 2 Manila Wrapping, 35 lb.	5.00	"	—
Boards, per ton—			
News	35.00	@	40.00
Chip	35.00	"	40.00
Sgl. Mla. Ll. Chip	55.00	"	57.00
White Pat. Coated	67.00	"	70.00
Kraft Liners	55.00	"	—
Binders Boards	73.00	"	80.00

The following are representative of distributors' resale prices:

Rag Content Bonds and Ledgers—
White, Assorted Items,
Delivered in Zone 1:

	Bonds		Ledgers	
100% Rag Ext. No. 1	$39.10	@ $46.00	$40.25	@ $47.25
100% Rag	31.05	" 36.50	32.20	" 37.75
85% Rag	....	"	29.90	" 35.00
75% Rag	23.60	" 27.75	24.75	" 29.00
65% Rag	....	"	21.65	" 26.25
50% Rag	17.55	" 21.50	18.70	" 22.75
25% Rag	14.65	" 17.75	15.80	" 19.25

Colors at $1.00 cwt. extra.

Sulphite Bonds and Ledgers—
White, Assorted Items,
Delivered in Zone 1:

	Bonds		Ledgers	
No. 1	$9.35	@ $11.50	$11.55	@ $12.75
No. 2	8.50	" 10.25	9.65	" 11.75
No. 3	8.05	" 9.25	9.20	" 11.25
No. 4	7.70	" 9.50	8.90	" 10.75

Colors $1.00 cwt. extra.

Free Sheet Book Papers—
White, Cased Paper,

Delivered in Zone 1:

No. 1 Glossy Coated	$11.90	@	$13.50
No. 2 Glossy Coated	10.35	"	11.75
No. 3 Glossy Coated	9.55	"	11.00
No. 4 Glossy Coated	9.15	"	10.50
No. 1 Antique (watermarked)	9.05	"	$10.50
No. 2 Offset	8.40	"	9.75
A Grade E. F.	8.20	"	9.50
A Grade S. & S. C.	8.45	"	9.75
B Grade E. F.	7.65	"	8.75
B Grade S. & S. C.	7.90	"	9.00
C Grade E. F.	7.35	"	8.50
C Grade S. & S. C.	7.60	"	8.75
D Grade E. F.	7.10	"	8.25
D Grade S. & S. C.	7.35	"	8.50

Ivory & India at $.50 cwt. extra.

Mechanical Pulp

(On Dock, Atlantic Ports)

No. 1 Imported—			
Moist	Nominal		
Dry	Nominal		
(Delivered)			
No. 1 Domestic and Canadian	45.00	@	46.00

Chemical Pulp

(On Dock, Atlantic, Gulf and West Coast Ports)

Bleached Sulphite (Domestic and Foreign)—			
Prime Bleached Sulphite	3.72½	@	3.87½
Prime Qualities—			
Easy-Bleaching Sulphite	3.17½	"	3.75
Strong Unbleached Sulphite	3.17½	"	3.75
(On Dock, Atlantic Ports)			
Kraft Bleached	4.12½	"	
Kraft Light & Strong	3.50	"	3.75
Kraft No. 1	3.40	"	3.60
(F. o. b. Pulp Mill)			
Kraft Domestic and Canadian	2.75	"	3.25
(Delivered)			
Soda Bleached	3.30	"	—

Add 60 cents per short ton, dock charges for Albanay; $2.50 for Lake Ports East and $3.50 for Lake Ports West of Mackinac Straits.

Domestic Rags

New Rags

(Prices to Mill f. o. b. N. Y.

Shirt Cuttings—			
New White, No. 1	6.75	@	7.00
Silesias No. 1	4.60	"	4.75
New Unbleached	6.50	"	6.75
Blue Overall	4.35	"	4.50
Fancy	3.25	"	3.50
Washables	2.00	"	2.10
Mixed Khaki Cuttings	2.75	"	3.00
O. D. Khaki Cuttings	3.15	"	3.30

Old Rags

White, No. 1—			
Repacked	3.25	"	3.50
Miscellaneous	2.75	"	3.00
White, No. 2—			
Repacked	2.50	"	2.75
Miscellaneous	2.00	"	2.25
Thirds and Blues—			
Repacked	2.00	"	2.25
Miscellaneous	1.75	"	1.90
Roofing Rags—			
No. 1	.95	"	1.00
No. 2	.80	"	.85
No. 3 (bagging)	.90	"	1.00
No. 4	.60	"	.65
No. 5A	.60	"	.65

Foreign Rags

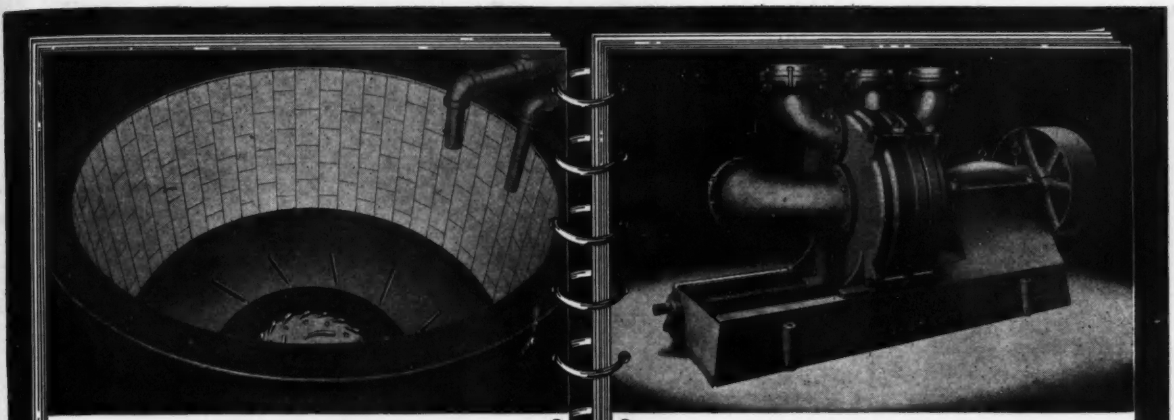
All prices nominal

New Rags

New Dark Cuttings	2.25	@	2.40
New Mixed Cuttings	2.00	"	2.20
New Light Silesias	5.50	"	5.75
Light Flannelettes	5.50	"	5.75
New White Cuttings	7.00	"	7.50
New Light Oxford	4.00	"	4.50
New Light Prints	3.00	"	3.25

Old Rags

No. 1 White Linens	7.50	"	8.50
No. 2 White Linens	6.50	"	7.50
No. 3 White Linens	4.50	"	—



DILTS-COWLES HYDRAPULPER

Within 10 to 15 minutes a load of 3000 or more pounds fed into the Dilts Hydrapulper in complete bales, laps or slabs—is fully pulped to any desired consistency.
Not only does the Hydrapulper pulp faster and for less money but it pulps more uniformly. Yesterday's pulping equipment seems antiquated when compared with this surprising new unit.
The Dilts Hydrapulper has a place in every paper plant—its application to batch or continuous systems seems unlimited.

COWLES CLASSIFINER

71 years of Dilts engineering experience and skilled craftsmanship are back of the Cowles Classifiner. Small wonder then that this machine is the industry's most efficient unit for defibering and clarifying waste paper stock.
The Cowles Classifiner is designed to fit into present systems, or into the special Dilts stock preparation systems. It requires only 1/10 the space—uses far less power—and still turns out a greater volume of work than is produced by old type equipment.

Dilts **Dilts**

DILTS MACHINE WORKS, Fulton, N. Y.
Division of The Black-Clawson Company, Hamilton, Ohio

EXTRA The New

HETEROPHYTES* INVADE PAPER MILLS

Fifth Column Activities Revealed

When slime forming organisms invade paper mills, there's no tramp, tramp, tramp of marching feet—these fifth column heterophytes pursue their subversive activities unseen, unnoticed—until accumulations of slime cause severe production losses!

Profits disappear when slime appears—you get stock losses, blinded wires, plugged felts, obstructed pipe lines and costly growths in recirculating systems. And profits disappear too when shipments are rejected as a result of slime spots or high bacterial count.

Don't wait until your mill is overrun by heterophytes . . . and slime wins out! Destroy slime forming organisms with chlorine and ammonia, controlled by W&T apparatus. Preparedness costs little—from 1½ to 10c per ton of product!

Send today for your copy of the new W&T reprint "Microbiological Control in Pulp and Paper Manufacture." It tells how you can combat the invasion of heterophytes by preparedness!

*Heterophyte: Any dependent organism which derives its sustenance from dead organic matter, or at the expense of some other living organism . . . as "parasite" which means literally, "eating at the table of another," or, as "slime forming micro-organisms" — uninvited guests which "eat at the table of the paper manufacturer."

P30

WALLACE & TIERNAN CO. Inc.

Manufacturers of Chlorine and Ammonia Control Apparatus
Newark, New Jersey — Branches in Principal Cities

Other Services: Automatic pH Control • Dry Chemical Feeders • Bleach Plant Equipment • Testing Instruments for Chlorine and pH

No. 4 White Linens	2.25	@	3.25
No. 1 White Cotton	4.25	"	4.75
No. 2 White Cotton	3.25	"	3.75
No. 3 White Cotton	2.50	"	3.00
No. 4 White Cotton	1.90	"	2.20
Extra Light Prints	2.00	"	2.40
Ord. Light Prints	1.75	"	2.15
Med. Light Prints	1.55	"	1.95
Dutch Blue Cottons	2.25	"	2.50
French Blue Linens	3.00	"	—
Checks and Blues	2.00	"	—
Linsey Garments	1.90	"	2.00
Dark Cottons	1.50	"	1.60
Old Shopperies	1.30	"	1.45
New Shopperies	1.45	"	1.50
French Blues	2.25	"	2.50

Old Rope and Bagging

(Prices to Mill, f. o .b. N. Y.)

Gunny No. 1—			
Foreign	2.75	@	3.00
Domestic	2.50	"	2.75
Wool Tares, light	2.00	"	2.25
Wool Tares, heavy	2.12½	"	2.25
Bright Bagging	2.25	"	2.50
Manila Rope—			
Foreign	4.75	"	5.00
Domestic	4.50	"	4.75
Jute Threads	2.62½	"	2.75
Sisal Strings	2.10	"	2.35
Mixed Strings	1.10	"	1.20

Old Waste Papers

(F. o. b. New York)

Shavings—			
White Envelope Cuttings	3.10	@	3.25
Ordinary Hard White No. 1	2.25	"	2.50
Soft White No. 1	1.80	"	1.90
Soft White Extra	2.50	"	2.60
Flat Stock—			
Stitchless	1.10	"	1.25
Overissue Mag	.90	"	1.00
Solid Flat Book	.80	"	.85
Crumbled No. 1	.70	"	.75
Ledger White Stock	1.80	"	1.90
Ledger Stock Colored	1.30	"	1.40
Manila—			
New Env. Cut	1.70	"	1.80
New Cuttings	1.30	"	1.40
Old Kraft Machine Compressed bales	1.50	"	1.60
News—			
No. 1 White News	1.75	"	1.90
Strictly Overissue	.70	"	.75
Strictly Folded	.50	"	.55
Corrugated	.65	"	.67½
No. 1 Mixed Paper	.32½	"	.35

Twines

(F. o. b. Mill)

(Soft Fiber)

Coarse Polished—			
India	.19½	@	—
White Hemp	.19½	"	—
Fine Polished—			
Fine India	.23	"	—
Unpolished—			
Box	.17	"	—
Paper Makers	.15½	"	—
Tube Rope	.16¾	"	—
Wall Paper	.15½	"	—
Wrapping	.18	"	—
Soft Fiber Rope	.16¾	"	—
Cotton	.16¾	"	—

(Hard Fiber)

Medium Java	.20	"	—
Mex. Sisal	.17	"	—
Manila	.24	"	—

PHILADELPHIA

Domestic Rags (New)

(Price to Mill, f.o.b. Phila.)

Shirt Cuttings—			
New White No. 1	.06	@	.06¼
New White No. 2	.03½	"	.04
Light Silesias	—	"	.04½
Silesias, No. 1	—	"	.04
Black Silesias, soft	—	"	.03
New Unbleached	.06	"	.06¼
Washable Prints	.02¾	"	.02½
Washable, No. 1	—	"	.01¾
Blue Overall	.04	"	.04½
Cottons—According to grades—			
Washable shredding	—	"	.01¾
Fancy Percales	—	"	.03
New Black Soft	.02¼	"	.02¾
New Light Seconds	—	"	.04
New Dark Seconds	—	"	1.50
Khaki Cuttings—			
No. 1 O. D.	.03½	"	.03¾
No. 2 Mixed	.01¾	"	.02
Corduroy	.01¾	"	.01½
New Canvas	.04½	"	.05
New Black Mixed	—	"	.02¼

Domestic Rags (Old)

White No. 1—			
Repacked	3.00	@	3.50
Miscellaneous	2.50	"	2.75
Thirds and Blues—			
Miscellaneous	1.35	"	1.50
Repacked	1.55	"	1.65
Black Stockings (Export)	3.50	"	4.00
Roofing Stock—			
Foreign No. 1	Nominal		
Domestic No. 1	—	"	.80
Domestic No. 2	—	"	.80
Roofing Bagging	—	"	.70

Bagging

(f.o.b. Phila.)

Gunny, No. 1—			
Foreign	Nominal		
Domestic	2.25	@	2.50
Manila Rope	—	"	4.75
Sisal Rope	1.75	"	2.00
Mixed Rope	.75	"	1.00
Scrap—			
No. 1	2.25	"	2.50
No. 2	—	"	1.50
Wool Tares, heavy	3.50	"	3.70
No 1 New Light Burlap	3.00	"	4.00
New Burlap Cuttings	4.00	"	2.25

Old Papers

(f.o.b Phila.)

Shavings—			
No. 1 Hard White	2.40	@	2.50
No. 2 Hard White	2.10	"	2.15
No. 1 Soft White	2.00	"	2.10
No. 2 Soft White	1.60	"	1.75
No. 1 Mixed	.90	"	1.00
Solid Ledger Stock	1.90	"	2.00
Ledger Stock, white	1.75	"	1.80
Ledger Stock, colored	1.25	"	1.30
No. 1 Books, heavy	.80	"	.85
Manila Cuttings	1.75	"	1.80
Print Manila	.60	"	.65
Container Manila	.50	"	.55
Kraft Paper	1.50	"	1.60
No. 1 Mixed Paper	.40	"	.45
Straw Board Chip	.40	"	.45
Binders Board Chip	.40	"	.45
Corrugated Board	.65	"	.70
Overissue News	.75	"	.80
Old Newspapers	.45	"	.50

BOSTON

Old Papers

(f.o.b. Boston)

Shavings—			
No. 1 Hard White	2.75	@	3.00
No. 1 Soft White	2.00	"	2.25
No. 2 Mixed	.75	"	.80
Solid Ledger Books	1.50	"	1.75
Overissue Ledger Stock	1.75	"	2.00
Mixed Ledgers	.85	"	.90
No. 1 Heavy Books	1.10	"	1.20
No. 1 Books, light	.65	"	.75
Crumpled Stitchless Book Stock	.55	"	.65
Manila Env. Cuttings	1.85	"	2.00
Manila Envelope Cuttings, extra quality	2.35	"	2.60
White Blank News	1.40	@	1.50
No. 1 Kraft	1.35	@	1.40
Extra No. 1 Kraft	1.60	"	1.90
Mixed Papers	.35	"	.40
Print Manila	.50	"	.55
Container Manila	.60	"	.70
Old Newspapers	.50	"	.55
Paper Wool Strings	.95	"	1.10
Overissue News	1.00	"	1.10
Box Board Chips	.40	"	.45
Corrugated Boxes	.60	"	.65
Kraft Corrugated Boxes	1.05	"	1.15
New Kraft Corrugated Cuttings	1.50	"	1.65
Screening Wrappers	.60	"	.70

Bagging

(f.o.b. Boston)

Gunny Bagging—			
Foreign	—	"	2.50
Domestic	2.25	"	2.35
Sisal Rope	2.00	"	2.25
Mixed Rope	.85	"	1.00
Transmission Rope—			
Foreign	—	"	2.40
Domestic	2.25	"	2.40
Soft Jute Rope	3.00	"	3.25
Manila Rope—			
Foreign	4.75	"	5.00
Domestic	4.75	"	5.00
Jute Carpet Threads	1.50	"	1.75
Gunny Bagging—			
Foreign	2.75	"	2.85
Domestic	2.25	"	2.50
Bleachery Burlap	4.00	"	3.25
Scrap Burlap—			
Foreign	2.45	"	2.50
Domestic	2.15	"	2.35
Scrap Sisal	2.25	"	2.50
Scrap Sisal for Shredding	2.30	"	2.65
Wool Tares, Domestic	2.40	"	2.50
Wool Tares, Heavy—			
Foreign	2.25	"	2.40
Aust. Wool Pouches	2.75	"	3.00
New Burlap Cuttings	3.75	"	4.00
Heavy baling bagging	2.25	"	2.40
Paper Mill Bagging	1.75	"	2.00
No. 2 Bagging	.75	"	.80

Domestic Rags (New)

(F. o. b. Boston)

Shirt Cuttings—			
New Light Prints	—	@	.03
Fancy Percales	.04	"	.04¼
New White No. 1	.07½	"	.07¾
New Light Flannelettes	.05	"	.05¼
Canton Flannel, Bleached	.07	"	—
Silesias No. 1	.05	"	—
New Black Silesias	3.00	"	3.25
Red Cotton Cuttings	.04	"	.05
Soft Unbleached	.07	"	.07½
Blue Cheviots	.05	"	.05½
Fancy	.02	"	.02½
Washable	.02	"	.02½
Cottons—According to Grades—			
Blue Overalls	.04¾	"	.05
New Black, Soft	.03	"	.03¼
Khaki Cuttings	.05	"	—
O. D. Khaki	.03	"	.03½
Corduroy	.02¼	"	.03
New Canvas	.06¼	"	.07¼
B. V. D. Cuttings	.07	"	.07½

Domestic Rags (Old)

(F. o.b. Boston)

White No. 1—			
Repacked	2.75	"	3.75
Miscellaneous	2.40	"	2.60
White No. 2—			
Repacked	1.90	"	2.00
Miscellaneous	2.00	"	2.25
Twos and Blues	1.50	"	2.00
Old Blue Overalls	1.60	"	2.00
Thirds and Blues—			
Repacked	—	"	1.25
Miscellaneous	—	"	1.00
Black Stockings	3.50	"	4.00
Roofing Stock—			
No. 1	1.00	"	1.25
No. 2	—	"	1.10
No. 3	—	"	.90

Foreign Rags

(F. o. b. Boston)

Canvas	.04¼	@	—
Dark Cottons	(nominal)		
Dutch Blues	(nominal)		
New Checks and Blues	(nominal)		
Old Fustians	(nominal)		
Old Linsey Garments	(nominal)		
New Silesias	(nominal)		

CHICAGO

Waste Paper

(f.o.b. Chicago)

Shavings—			
No. 1 White Envelope cuttings	3.15	@	—
No. 1 Hard White	2.50	"	2.65
No. 1 Soft White	2.00	"	2.20
Ledger and Writings	.85	"	.95
Solid Books	.95	"	1.10
Blanks	1.50	"	1.60
Krafts	1.40	"	1.50
New Kraft Cuts	1.60	"	1.75
Overissue News	1.00	"	1.10
Old Newspapers—			
No. 1 Folded News	.70	"	.80
No. 1 Mixed Paper	.40	"	.50
Roofing Stocks—			
No. 1	.95	@	1.00
No. 2	.85	"	.90

Diesel-Electric Locomotives

Widespread adoption of diesel-electric locomotives in a wide variety of industries is revealed by a survey recently completed by the General Electric Company, Erie, Pa. More than 40 such locomotives have gone into industrial service since the new type was introduced about two years ago; and more than half of this total were delivered or are on order so far this year.

Cement, paper, sugar, soap, roofing, steel, asphalt, and chemical plants are among the users. So are coal mines, quarries, shipbuilding yards, and constructors. Geographically the locomotives are in service from Canada to Panama and the Philippines, and in 19 states between the four corners of this country—Washington, California, Florida, and New England. The locomotives range from several of 20 tons and 150 horsepower to some of 80 tons and 500 horsepower. Additional to the diesel-electric locomotives in industrial service, many have been delivered recently or are on order for railroad switching and branch-line service, the company reports.

Reports from different industries using the new diesel-electric locomotives show surprisingly large savings, particularly in those cases where the new locomotives replace steam locomotives of many years' service.

Pulpwood Demurrer Filed

The American Pulpwood Association withdrew its plea of not guilty in Federal Court September 19, and filed a demurrer to an indictment alleging it conspired with 12 of its corporate members to violate the Fair Labor Standards Act. The demurrer states the defendant is an unincorporated association and, as such,